Aeronautics

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M. Louis Bleriot, first man to fly the English Channel, who contributes an important review of the past and a prediction for the future, in our January issue.

From THE PUBLISHER'S QUILL

"Simple duty hath no place for fear"
Whittier

Aeronautics ADVOCATES

A unified air service with adequate appropriations.

A great National Air Academy.

Repeal of tax on gasoline sold on air fields.

Unified State and National laws governing aircraft.

BORDER CITIES AIR MEET

IT remains for Canada to put on an air show with the true touch of dignity and the proper respect for the manufacturer's pocket-book.

Contrasted with the noisy costly shows which have been hanging on to the American manufacturer's neck like an old man of the sea, the big Border Cities Air Meet on October 5 and 6 was a revelation in courtesy and worth.

More than 40,000 people crowded into Walker Airport, without benefit of fireworks or high pressure. The attitude all around was friendly and sound. As far as we were able to find out, everybody went away happy.

Manufacturers who attended found their way paid by their enterprising hosts (mostly Scottish bye the bye) who went to great lengths to make their visitors comfortable. The various ships were in line on the field, where they should be, for inspection.

We regard this procedure as essentially sounder in the long run than cajoling everybody in sight to be present under pain of awful loss if not represented.

Duncan McColl, chairman of the Border Cities Club, and Douglas Jeffrey, in charge of the meet, did themselves proud. The whole affair was handled with rare perfection and undoubtedly will make many friends for Canadian aviation.

AIR LINE LEGISLATION

CONGRESSMAN JOHN CABLE* of Ohio, for whom we made a survey recently, tells me that he has introduced a bill in the national Congress designed to place the aerial transport business under regulation.

AERONAUTICS, with the most sincere belief in the ability and high purpose of Representative Cable, has nevertheless consistently opposed regulation at this time. We have had a number of letters from those in favor of legislation hot enough to melt the end off the North Pole. The common inference was that we "have been bought" by an enterprising group of manufacturers.

Edwin G. Thompson of Ohio, successful transport operator, gives an opinion in this issue which is substantially the same as our own. Presenting as we do able minds on both sides of the same question we fully expect to be jumped on from both flanks. We have in fact already instructed a neighborhood stone cutter to inscribe *poor but proud* on our epitaph.

* Senators Walsh of Massachusetts and Bratton of New Mexico have introduced similar bills in the Senate to regulate carriers by air for Interstate and Foreign Commerce.

ACCIDENTS AND PUBLICITY

AERONAUTICS is entirely in accord with this editorial from the pen of Ernest Jones. For those who are new to the industry, Ernest was one of aviation's pioneer editors in the days when aviation editors did not eat very often.

There should no longer be made mystery of airplane accidents and their causes. Good faith with the public, so intensively propagandized for airmindedness, demands there be published full explanations of accidents and that the responsibility be fixed.

The airplane is not a vehicle inherently liable to strange and unavoidable mishaps and there is no good reason for fostering in the public mind such an opinion; but continued official secrecy must obviously tend toward that result, to the great disadvantage of air transportation and pleasure flying.

"I have never seen an accident, nor have I ever read a complete analysis of the cause or causes of an accident, that I did not learn a lesson of value to myself. That lesson had the effect of warning me against allowing a similar misfortune happening to me," says one of America's greatest pilots.

The mere statement that a certain percentage of accidents in a certain period was due to error in pilotage, or the explanation of an accident by the word "spin," and tabulated statistics in general are of little value from an educational point of view.

The whole story of the accident must be told.

The full publication of causes and responsibility, at least so far as fatal ones are concerned, would insure the confidence of the public, prove of great interest and value to all pilots and students, and have a greatly deterrent effect upon the relative number of subsequent accident statistics.

At least two United States Senators seem to have become peeved at this bureaucratic secrecy. The McKellar-Bratton resolution, after several whereases referring to certain fatalities, Department of Commerce investigations and the refusal of the Department "to make the causes of such accidents public, or to furnish copies of the record to Senators of the United States upon request, except in confidence," resolves

> "that the Secretary of Commerce be, and he hereby is, directed to furnish to the Senate a copy of the record in each of the said cases for the use of the Senate."

Senator Bratton, in his bill to regulate interstate and foreign air commerce under the Interstate Commerce Commission, takes particular pains to insure the public character of accident investigations.

> "In carrying out his duty to investigate and record and make public the causes of accidents in civil air navigation in the United States, the Secretary of Commerce shall report upon any accident that the Secretary knows or has reason to believe occurred in interstate or foreign air commerce and resulted in serious personal injury or death.
>
> "The Secretary shall include in his report his findings as to the causes of the accident and the responsibility therefor. * * * The Secretary shall hold public hearings * * * administer oaths, examine witnesses, and issue subpoenas * * *

[*Continued on page 86*]

AMERICA TRAILS IN W

by General Wm. Mitchell

General Mitchell tells how various nations have approached and solved air problems . . . . . .

ONE often hears the question, "Who leads the world in aeronautics?"

In order to answer that, we must look at the matter from as impartial a viewpoint as possible, unaffected by the vaporings of the political bureaus in Washington, or the writings that emanate from certain political-financial groups. The former are trying to maintain their positions by flooding the country with information, a great deal of which is mere "bunk," while the latter are busy making money out of aviation, either by selling aircraft to the government at ridiculously high prices, or promoting aviation from a stock-jobbing standpoint.

The Navy Department has been the greatest hindrance to the development of aeronautics in the United States by preventing the organization of a department of the air, with a secretary in the cabinet of the President. It is one of the worst examples in our history of a pernicious lobby established and maintained by one of the departments of our government which has subverted the public good and national defense to personal greed and private gain. The way that the lobby works is insidious in the extreme. It is difficult to fix responsibility on the individual and those who know most about it are unwilling to give testimony in specific instances.

The Navy Department, to further their propaganda in favor of battleships, cruisers and the absorption of all aviation into the Navy, work through various channels. Their Intelligence Division regularly sends out printed matter to various Naval officers scattered through the country, to be used as propaganda. Part of this intelligence is for publication and part is secret. Wherever possible, Naval reserve officers are placed on the editorial staffs of the large journals that sway the opinion of the country. As opposed to this, there is no department of aeronautics to put out its own propaganda about air power.

The Naval Committees in both the Senate and House of Representatives are entirely dominated by the Navy Department. They seldom hear, nor are they allowed to hear, anything that shows the great superiority of air power over sea power, the impotence of our naval defense, the number of useless naval stations maintained by the Navy, and the complete inefficiency of the so-called Naval Air Force.

The Military committees take much the same attitude that the Naval committees do. As they also are more or less dominated by the naval clique in Washington, they have little to say for themselves. Most people think there are air committees in Congress but such is not the case. All aeronautical legislation has to be sieved through the Naval, Military or Commerce committees before becoming the law of the land. President Hoover and the present administration have been informed of this condition of affairs.

The Navy lobby in Washington combines within it all the financial interests that have to do with the shipbuilding, steel, fuel and aircraft industries, and works by furnishing information to our national legislature, by personal suasion, by "heeling" members of Congress, and by attempting to exclude everyone who will give evidence against what it advocates. I myself believe they have gone further than this and have used money indirectly with certain individuals, through some of the manufacturers, as has been suggested in the Shearer case.

The necessity for the simplification of the whole bureaucratic system is apparent. We are rapidly getting into the

WORLD AERONAUTICS

condition of an oligarchy in which the heads of bureaus run the whole government. The states and their representatives in Congress are becoming entirely subservient to them. The whole system is so complicated that the President as executive cannot watch it all. The result of such a situation is always colossal dishonesty, inefficiency and a loss of confidence of the people in our governmental organization.

The formation of an adequate aeronautical policy for this country rests on the shoulders of the President and Congress. Heretofore these matters have been referred to the army and navy for advice, but as they have proved themselves to be incompetent in the handling of this great new development, Congress must now assume the responsibility unaided and find out what the world is doing with aeronautics.

Four things are requisites to a maximum development of air power: First, the ability of a people to fly aircraft under any and all conditions; second, the ability to invent and construct aircraft; third, a country must be so situated and arranged geographically that it lends itself to the operation of aircraft; and fourth, there must be a suitable organization for the control of aeronautics of all kinds by the government.

Since the beginning of aviation, I have followed its development closely, both here and abroad. During and since the war, I have kept in personal touch with the flying men and engineers of the great nations of Europe and Asia, and maintained an acquaintance with their airplanes both by frequent visits to their countries and by flying their aircraft.

In reviewing what other nations are doing, we will notice that in each instance the great countries have a single department of aviation under a cabinet member or minister who has as great a voice in the councils of the state as any other minister. In case of war, all the air power is handled as one body under a single head instead of having its strength wasted by being split up into small groups, under different departments. The experimental work is carried on under one direction, which is not only more efficient but also more economical. Every cent put into it can be made to yield the maximum value.

While the commercial value of aviation is beginning to make itself felt, still its dominant characteristic is as a military asset. Everywhere we find air power used as the first line of defense of a country.

GREAT BRITAIN established a Ministry of Aviation separate from her army and navy in 1917, because it became evident during the war that the conflict of authority and divided responsibility between army and navy made it impossible for them to operate aircraft efficiently against the enemy, who had a united air force.

The Air Ministry is divided into three principal parts:

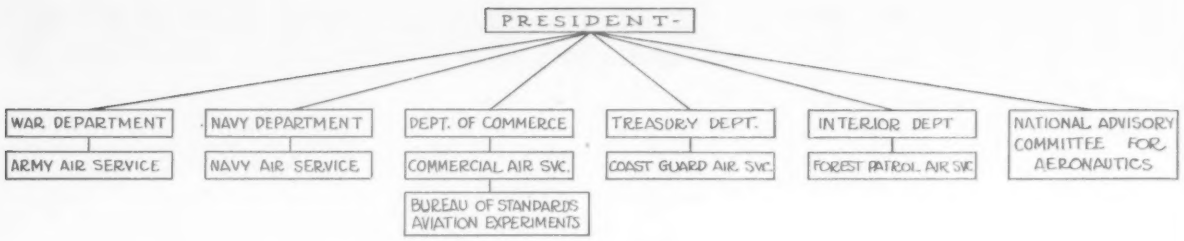
First, there is the military air force, which is organized into squadrons, wings, brigades and divisions, to be used as a striking force against an enemy and to act independently, entirely distinct from army and navy. Whatever auxiliary air service the army and navy need for their own domestic use is organized and trained by the Air Force and then assigned to these services. In this way, competent air units are assured. The meteorological service is under the Air Force, and a good weather service is the result.

Second is the department of commercial aviation, which looks after all the airways, aids to air navigation, the inspecting and chartering of commercial airplanes and pilots, the publication of figures and reports on costs and advantages of air transportation, and the furnishing of advice to companies desiring to enter the air transportation field.

Third is the department of experimentation and development. This seeks out and develops all the new devices that are considered appropriate for aeronautical work. It helps the manufacturers and does the purchasing, storing and issuing of supplies for the Government. Few people know of the classes of aircraft behind the planes actually in operation by the British. Besides those with which her services are equipped today are numbers of new types which have been experimented with and found superior to the old ones. They are ready to be manufactured in quantity, whenever needed. Still another class comprises those in the experimental stage, but ready to be tried out. Thus if England went to war tomorrow, her whole aviation would be equipped with entirely new types of planes, possessing superior characteristics to those previously in use, while those in the experimental class would be rapidly pushed to completion.

The British Navy attempted in every way to stop the organization of the Air Ministry because they considered it would supplant their operations and lead to a different system of war, which of course is true. In 1923, they made a very determined effort to do away with the Air Force, in which they were unsuccessful. The following remarks on the subject made at that time by Lord Gorrell before the House of Lords are very interesting:

"It is perfectly true that the basis of inquiry has shifted. Originally it was a plain demand for the splitting up again of the Air Force. Now it takes the form of the demand by the Navy for the Naval Air Wing. I had occasion, when speaking last year on this subject, to point out that the Navy have complete operational control of all air units serving with them, and though it sounds extremely specious that the Navy should have their own Air Wing, I want, if the Government is prepared to answer the questions I am directing at them on this subject, to point out that there is no stopping place. We have heard a great deal of naval air and military air, and other absurdities of that kind in this discussion. There is one air just the same as there is one sea, and it is perfectly impossible to draw a line of demarcation in which part of the air shall be given to the Navy and the rest of the air to the Air Force.



The present organization of American aeronautics. Aviation is split between the various departments, constituting in most cases a neglected auxiliary of the department to which it is attached.

"Everybody who has had any experience in the Air Force knows that perfectly well, and I venture to say also that all the naval authorities know it quite well; in fact, one of their protagonists in your Lordships' House, Lord Vernon, last year stated that the basis of their action was to endeavor to lift the Navy into the air. There can be no dividing line."

England has a model Air Ministry. There is now no interference by the Army and Navy with its development. It is popular with the people and with Parliament, who know that the future safety of the British Empire depends primarily on its Air Force.

Great Britain also maintains a separate air force in each of her territories, Australia, Canada and India. A great deal has been done by these forces. The Indian Air Force has been much more efficient in patrolling the border and keeping down warlike tribes than the army used to be. Recently, their airplanes flew into Kabul, Afghanistan, during the insurrection against King Amunullah and rescued the Europeans isolated at that place.

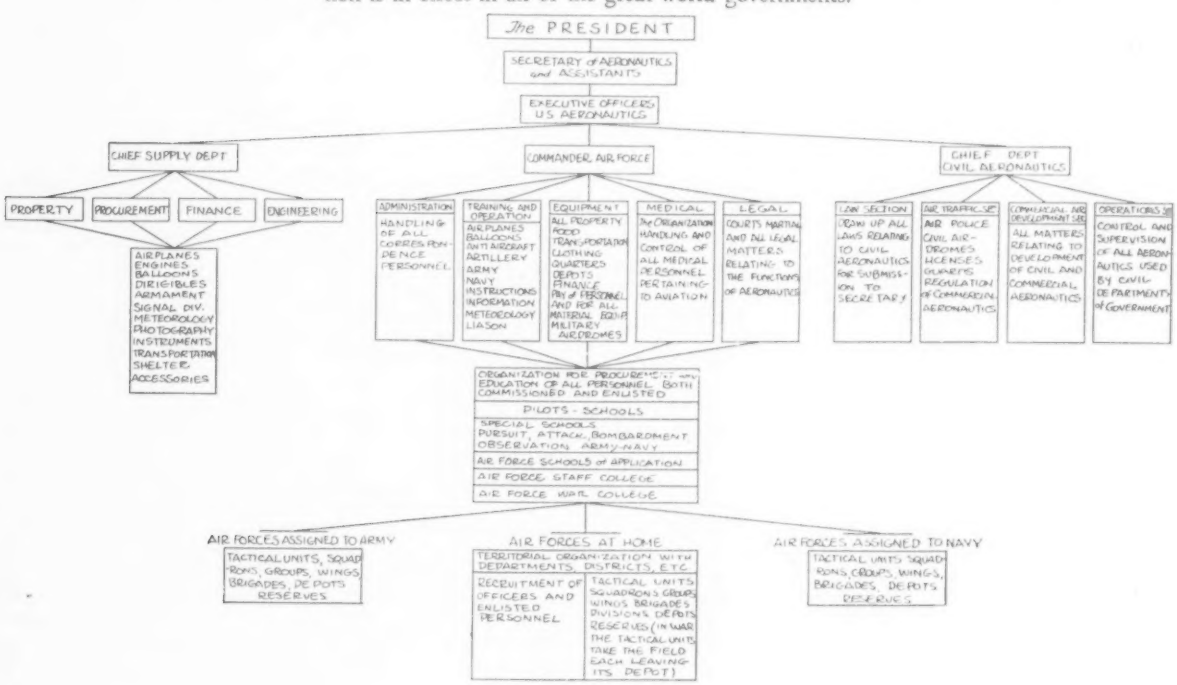
They have found that the administration of occupied territory is more economical with an air force than with either an army or navy. In Iraq, which covers an area about half the size of Mexico, the military commander is an Air Force officer. Whatever detachments of the army or navy are there report to him. If trouble occurs at a distance of, say, three or four hundred miles from an air base, planes are sent to the locality to notify the chiefs to stop their depredations or immediate action will be taken. These planes fly there and back in four or five hours, a distance which would require days on end for an army to cover. In most cases, the chiefs now know that airplanes can attack their cities, their horses and camels and means of transportation, so as to render them helpless. When the Air Force was first put in, they tried to resist, the same way they had against an army, but airplanes were so quick and efficient in their action that this was stopped at once.

In case it is desired to occupy any place on the ground, transport airplanes each holding twenty soldiers with full equipment are dispatched. They land under the protection of the air force and occupy the towns. The administration of this great area by the Air Force has been a tremendously successful undertaking and has reduced the cost vastly from what it would have been had an army tried to do the same thing.

Sir Samuel Hoare, British Minister of Aviation, in a lecture delivered on May 11, 1928, said:

"In the case of Iraq, since the Royal Air Force took over the control from the army, our expenditure on the defense of that country has been reduced from 30,000,000 pounds (or $150,000,000) to 2,000,000 pounds (or $10,000,000) a year. [*Continued on page 46*]

General Mitchell suggests here an organization for aerial efficiency. A similar plan of organization is in effect in all of the great world governments.


The PRESIDENT
SECRETARY of AERONAUTICS and ASSISTANTS
EXECUTIVE OFFICERS, U.S. AERONAUTICS
CHIEF SUPPLY DEPT
PROPERTY
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AIRPLANES ENGINES BALLOONS DIRIGIBLES ARMAMENT SIGNAL DIV. METEOROLOGY PHOTOGRAPHY INSTRUMENTS TRANSPORTATION SHELTER ACCESSORIES
COMMANDER, AIR FORCE
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AIRPLANES BALLOONS ANTI-AIRCRAFT ARTILLERY ARMY NAVY INSTRUCTIONS INFORMATION METEOROLOGY LIAISON
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OPERATIONS SEC
CONTROL AND SUPERVISION OF ALL AERONAUTICS USED BY CIVIL DEPARTMENTS of GOVERNMENT
ORGANIZATION FOR PROCUREMENT AND EDUCATION OF ALL PERSONNEL BOTH COMMISSIONED AND ENLISTED
PILOTS - SCHOOLS
SPECIAL SCHOOLS PURSUIT, ATTACK, BOMBARDMENT OBSERVATION ARMY-NAVY
AIR FORCE SCHOOLS of APPLICATION
AIR FORCE STAFF COLLEGE
AIR FORCE WAR COLLEGE
AIR FORCES ASSIGNED TO ARMY
TACTICAL UNITS, SQUADRONS, GROUPS, WINGS, BRIGADES, DEPOTS RESERVES
AIR FORCES AT HOME
TERRITORIAL ORGANIZATION WITH DEPARTMENTS, DISTRICTS, ETC.
RECRUITMENT OF OFFICERS AND ENLISTED PERSONNEL
TACTICAL UNITS SQUADRONS GROUPS WINGS BRIGADES DIVISIONS DEPOTS RESERVES (IN WAR THE TACTICAL UNITS TAKE THE FIELD EACH LEAVING ITS DEPOT)
AIR FORCES ASSIGNED TO NAVY
TACTICAL UNITS SQUADRONS, GROUPS, WINGS, BRIGADES, DEPOTS RESERVES

AVIATION DOES NOT NEED FEDERAL CONTROL

A reply to those who desire Federal control over air transport lines

by Edwin G. Thompson*

IN an article in the November issue of AERONAUTICS Congressman John L. Cable of Ohio set forth his belief that "Congress should pass a law that when one responsible company has established a line from city A to city B, so long as such company maintains adequate service, a second company should not be permitted to compete with company No. 1."

To substantiate his views Legislator Cable has already drawn up a bill which he expects to introduce during the present session of Congress. The bill is titled "A Public Convenience and Necessity Certificate." Its purpose is to vest in the powers of the Interstate Commerce Commission, the authority to give exclusive rights for the operation of a transport air line between specific cities to the company it deems the most capable to conduct such a service; thus preventing another line inaugurating a service or operating planes between the two cities; and otherwise give this body the sole right to establish all civil airways.

Before questioning the soundness of Congressman Cable's judgment in believing one air line should have the exclusive right to operate a transport service between two cities, let us first consider the advisability of investing such power in the body his bill proposes.

In his article last month the legislator from Ohio stated: "The great development of commercial aviation and its regulation by the Federal Government has been under Herbert Hoover during his tenure of office as Secretary of Commerce." Why, therefore, should the authority now held by the Department of Commerce be taken away from it and given, with even greater power, to a body which knows theoretically nothing of the problems of aerial transportation?

Congressman Cable gives credit to the Department of Commerce for "the great development of Commercial Aviation." And from our own observations the Department of Commerce has most efficiently executed the duties given it under a Federal law, passed in the 69th Congress and entitled "An Act to Encourage and Regulate the Use of Aircraft in Commerce and for other purposes."

The formative stage, through which the whole aeronautical industry is now passing, and through which it is being so wisely guided by the Department of Commerce, is perhaps the most difficult it will ever be called to face. We are not yet through this period. There are many unchartered roads ahead.

William P. MacCracken, while Assistant Secretary of Commerce, in charge of Aeronautics, under Herbert Hoover, mapped the skyways for this industry. His work, and that of the department he represented, has rarely, if ever, been questioned. Now, however, he is no longer in charge of that work, having recently resigned. But in his place is a man equally as capable, who worked beside the former Assistant Secretary of Commerce in helping him blaze the trails —Major Clarence M. Young. We are confident he will continue Mr. MacCracken's excellent work. Consequently, why should not the Department of Commerce be permitted to continue its good influence—if there must be a type of Federal control?

If we were to continue on the premise that lawmaker Cable is correct in believing the measure he suggests is necessary, we would set forth numerous other arguments contesting that the Department of Commerce and not the Interstate Commerce Commission should be granted the power of issuing certificates for exclusive airway lines and administering the other duties his bill proposes. But we believe that the passage of a law granting a monopoly in the operation of any air route would be extremely unwise at this time no matter what body is assigned the authority to execute its powers.

In his article, "Protecting the Pioneers in Air Transportation," last month the congressman asks: "Why should a second company, not having the courage or initiative to make a survey, establish a new route, develop business and educate the people to travel by air, be permitted to set up a parallel route and take the cream when public convenience and necessity does not demand such service, the pioneer, or first company, adequately taking care of the business afforded?"

The most logical way to answer that question, we believe, would be to set forth another question asking: How can any one body arbitrarily issue an edict to the effect that line A is giving *adequate* service, thus prohibiting line B from inaugurating a line? We do not believe that any government body will be able to render *adequate* and unbiased judgment as to whether or not any one line is giving adequate service for some years to come. For, as we have stated before, the industry is in its adolescence period. It is experiencing growing pains

[*Continued on page 78*]

* President of Thompson Aeronautical Corporation, one of America's leading transport lines. It is interesting to note here that Mr. Thompson's line is one of two operating competitively between Detroit, Cleveland and adjacent cities.

WHERE IS THE

A Forecast for

by William B. Ziff

AS we pointed out editorially last month and have been warning for some time past, the curve of aviation sales, which should be definitely and continuously up, has actually taken a downward dip.

This indication of lack of public confidence in aviation and its various phases is alarming. It is ample evidence that the sales methods adopted are entirely inadequate. It is the inevitable result of the exclusive caste and play-boy feeling, the innate resentment against the inclusion of all outsiders, which has too long guided those in charge of selling the industry to the public.

With a noteworthy lack of Governmental assistance, time and money wasted at innumerable futile "air shows," and the deplorable feeling that the public must be excluded at all costs, it was not very difficult to predict the present depression.

This indictment is not due to the men who head many aeronautical manufactories and institutions. Many of these are brilliant and far-sighted. They realize that an industry is only created on mass participation and acceptance.

They would do well to investigate the exclusive and sneering attitude of many of their subordinates towards the unfortunate public, which in the writer's opinion underlies this entire depression.

Aeronautics has so long been the property of daredevils and heroes that most of those actively connected with the industry are colored with the idea that somehow they "are different." The attitude of sales managers and others is unconsciously haughty and noninvestigative and they seem content to work it out in the old fields rather than clean new pastures for the productive plough.

The countless air shows where precious money and time is wasted by somnambulant sales executives, who seem to regard each event as a great bibulous fiesta, is enough to indicate in itself *that the aeronautical industry has traveled too long on its ego.*

All optimism to the contrary, unless the industry about-faces and sets out like any other group of business men to win public confidence the reaction in a year or two will be severe and unavoidable. The public has been sold a great deal of ballyhoo on the basis of which millions of dollars have been poured into stock investment. Everyone has been led to believe that great things could be expected. The current lack of business perspective will prevent a justification of the immense sums at present invested in aeronautics. A debacle in the price of stocks will adversely affect public confidence in this industry in a fashion that will bring about only one real bit of good: there will be a lot of new faces present when it is all over. These new people will realize that aviation cannot be run on the club idea, and the upward climb of production and sales will continue uneventfully for many years until a natural saturation point is reached.

In an effort to clear the air of some of the cobwebs and goblins encumbering it, we wrote to a picked group of the best minds in this business and related businesses. The mass reply we have on hand indicates that a depression is here, that it came unexpectedly and despite the forced optimism of many letters, might be expected to continue.

The impression seems to exist in a number of shrewd minds that a considerable group of manufacturers and others can be expected to fold up and go out of business over winter and spring.

Many reasons have been advanced, among them overproduction, poor management, etc. Some of these executives disagreed with our contentions altogether and feel that the industry is getting on about as well as could be expected.

J. Allen Grover of Pynchon and Co. says: "As you know, conditions have been anything but pleasant in the aviation securities market within the last month, and constructive developments have been almost entirely lacking. . . . There is no use denying obvious facts, and if aviation executives themselves had been less secretive some months ago the precipitous declines of the last few weeks would not have taken place. By next spring undoubtedly the good aviation stocks will have recovered, but at the present time there is very little optimistic to say."

Sounding another angle, R. W. McKee, vice president of Richfield Oil Company, states: "There seems to be a decided depression in aeronautics among those companies that were formed hastily to build airplanes for which there was not a definite demand; most of these companies of this character are operating with high salaried executives with a primary view to stock promotion."

Benjamin F. Castle, president of Great Lakes Aircraft Corp., meets facts squarely in his constructive-minded communication: "There is undoubtedly a depreciation in the aviation industry which I believe to have been brought about by the fact that the potential market for the sale of airplanes, namely the field in which lies the individual of wealth, has not been extensively cultivated. I believe that volume of sales in the sport plane class will continue to be small until those who can profitably use an airplane for pleasure or business are made to realize that there is not a great hazard involved in sane flying and that it does not take a superman to pilot an airplane. This country is suffering from an hallucination which has been brought about through the short-sighted doctrine of certain post-war aviation readers who sought to convey the impression that it requires some sort of superman to fly an airplane. I believe that those of us who are interested in the aircraft industry can help to correct this erroneous belief by continually pointing out the relative ease with which the ability to pilot a plane can be acquired. Furthermore, we should disseminate a knowledge of the pleasure which can be derived from sport flying and the tremendous time saving which practical business men can effect by intelligent use of air transport."

R. B. Snowden, president of Commandaire, states that there is no doubt that a slump exists at present. He feels that many of the newer companies will be washed out, but that when the slump is over, reaction will be on a sound basis. Contrary to the opinion of S. Q. Noel, president of National Aircraft Welding School, who believes that motor manufacturers are getting a price for their wares far beyond reason and who suggests that "aircraft engine manufacturers come back to earth and cut their prices in half," Mr. Snowden makes a strong plea that manufacturers "maintain a stiff lip and a policy of not cutting prices," believing that if price cutting is started at the present time it

INDUSTRY HEADING?

Winter and Spring Business

will be almost impossible to reestablish them this spring after the slump is over. Mr. Snowden also points out that no one has yet demonstrated a successful quantity production manufacture system on airplanes and feels that prices should be kept adjusted to the present fair profit level, rather than decimated to a hypothetical large production basis.

It is interesting to note in reference to this that Russell Nicholas, president of Nicholas-Beazley Airplane Co., while believing that there is nothing basically unsound about the industry, frankly thinks that less than 40 per cent of the aircraft built this year have been sold and are really in the hands of the actual consumer. He feels that "those with a legitimate product in the smaller price class will be able to continue with a fair production this winter."

Don Alexander, president of Alexander Aircraft Co., thinks that one cause of depression is "the habit of some manufacturers to contract distributors for a schedule of deliveries beyond the capacity of user to consume, causing many ships to be stacked up in warehouses." He also feels that the buying public is waiting for new and semi-revolutionary models to come on the market.

Mr. Alexander is one of those who looks for a heavy recovery by spring.

James B. Taylor, Jr., president of Air Associates, remarks that "the sale of airplanes for the last few months has been almost nil, with the exception of some sales to transport companies." He does not look for rapid recovery, feeling that the whole industry is very much overexpanded. He believes that many companies will go out of business, others will merge, and final stabilization will come in several years.

It is of importance to note the great part he feels the schools will play in the business of aeronautics, stating that the graduation of a new group from the schools would contain sufficient wealthy young flying enthusiasts to constitute an added market. Mr. Snowden of Commandaire made essentially the same comment in this relation. A. W. Poole of the Los Angeles Chamber of Commerce says in marked contrast to the above that the extraordinary cost of a qualified flying course so depletes the exchequer of the student who completes it that he is unable to purchase a plane in consequence, leaving us with a licensed pilot with nothing to fly. He thinks that installment selling would obviate this difficulty.

It is Mr. Poole's personal opinion that "at the rate manufacturers of this country have been manufacturing ships without any thought to sales it is, in my opinion, definitely to be expected that we would have a depression, as we have at present." Mr. Poole feels that an active and educational sales campaign would remedy the situation quickly, and we are inclined to agree that this is the practical keynote of the whole matter.

Mr. Taylor, Jr., presented something of the same point of view, remarking: "Very few of the airplane companies, at the present moment, have really competent business executives connected with them. There has been absolutely no concentrated selling effort, and there still remains a great deal to be done in selling the general public on aviation."

F. B. Rentschler, president of United Aircraft and Transport Corp., speaks for a large group when he says: "There is a depression at this time in equipment manufacturing activities. To some extent this is no doubt seasonal. On the other hand it must be borne in mind that a very large number of new companies have come into the field during the past year. Obviously this condition has no doubt brought about a much keener competition, and of course has affected everyone in the industry.

"Aviation has grown almost too rapidly in the immediate past. A 'sellers' market is never a healthy condition. The period for readjustment is now just ahead, and it is fully believed that it will all result for the best, insofar as aviation as a whole is concerned.

"Sound organizations adequately financed and with good engineering and manufacturing facilities and experience will unquestionably come through the period with satisfactory results. Naturally the comparatively less sound organizations will experience difficulty, and may not survive."

Varying degrees of belief are expressed that the present downward sales trend is seasonal and to be expected, some letters indicating a belief that this may be avoidable by more attention to good sales methods. Among the executives feeling that a sound recovery may be expected by spring or early summer are Captain Walter Davis, Davis Aircraft Corp.; Ray M. Humphreys, Axelson Aircraft Engine Co.; W. R. Carnegie, Berry Bros.; R. G. Diehl, Macwhyte Company; Erle H. Smith, American Eagle Aircraft Corp.; W. J. Jarvie, Warner Aircraft Corp.; F. M. Smith, Moth Aircraft Corp.; J. M. Koch, Quaker State Oil Co.; Wm. T. Brown, A. G. Spalding and Bros., and R. E. Lees, Waco Aircraft Co.

Mr. Smith makes the interesting suggestion that incorporation of skees, pontoons, etc., for all weather flying will be of great value in enlisting popular usage. Feeling that the present slump is seasonal he believes that a greater use of cabin type aircraft will offset this type of depression.

Everywhere we find manufacturers looking forward eagerly to at least a partial absorption of their surplus in California and the Southwest this winter. Some place great hope in the expected results from the Western Aircraft Exposition at Los Angeles (this is being written just on the eve of that much-advertised show). It is well to bear in mind in reference to this that there was much promised the hapless exhibitor from the Cleveland show, which took place immediately preceding the present bad sales slump.

A minority express the thought that the market is normal with sales holding well. Some of these executives state that they have noted a distinct falling off in sales for other manufacturers despite the upward trend of their own. A large number of the latter are makers of accessories.

Numbered among those who view the present situation more or less sanguinely are F. B. Stover, Sky Specialties Corp.; Wayne G. Miller, Truscon Steel Company; C. W. Anderson, Naturaline Company; W. W. Moss, Berliner-Joyce Aircraft Corp.; Lyman H. Ford, Irving Air-Chute Co.; Earl D. Prudden, T. C. Ryan Flying School; Waldo D. Waterman, Los Angeles Metropolitan Airport; C. A. Border, Tulsa Chamber of Commerce, and J. L. Hamilton, International Derrick and Equipment Co.

Many of these, as in the case of Mr. Miller, whose company manufactures hangars and airport equipment, state that despite their own good sales they have reason to believe that there will be pretty dull times during the next six months for the bulk of aircraft manufacturers.

James Fitzpatrick, Vice President of the Haskelite Corp., makes this interesting observation, divergent at one point with our own views: "If there were less talk of depression and more constructive publicity, the present condition in the aviation industry would be obviated."

The general feeling among those with a more or less indirect connection with the aircraft industry is one of general surprise that there could be any expectation of downward sales dip. This undoubtedly springs from a realization that an industry as widely publicized and as demonstrably valuable in the lines of sport and public service as is aviation, should represent a consistent upward trend even under general adverse conditions.

De Forest Hulburd, president of Elgin Watch Company, practically speaks for this group as follows: "I do not quite understand whether your question regarding a business depression during the coming winter and spring refers only to the aviation industry, or to industry in general. If it refers to the latter, I personally do not see why there should be any depression this winter. It seems to me that conditions are basically sound, many industries are making unusually good earnings, and there does not seem to be any particular reason why there should be a depression."

G. W. Vaughan, Vice President of Wright Aero Corp., does not feel that the present status of affairs is such as to warrant apprehension. He views the present condition as largely a reaction to a rapid expansion, which while to be seriously viewed should not be considered with alarm.

Mr. Vaughan believes prospects for 1930 excellent. The most significant of his reasons is: "Sales managers are studying their markets and will have well organized sales plans, better servicing and distribution organizations, whereas these activities to date have been neglected in favor of production."

C. M. Keys, President of the Wright-Curtiss group and considered by many the ablest figure in aviation today, states: "There is a distinct dip in the commercial branches of the aviation industry as compared with the estimates of the spring of 1929, but actual deliveries and orders on the books are in excess of the corresponding figures for 1928 by a wide margin, and the closest students of the trade see nothing very alarming in the situation as a whole.

"The condition was clearly indicated months ago and the major units in the trade are ready for it. The remedy for it is obvious and already in effect. It consists of holding factory output within reasonable bounds throughout the winter, a consistent pushing forward of sales plans and policies, sound financing on the part of the manufacturers and the larger distributors, and a general steadiness and consistency of policy in respect to engineering, manufacturing and selling.

"Aviation is just like any other trade. The companies that get their budgets inside their income and keep them there, that maintain quality and that use good judgment in manufacturing and sales policies, will do very well in the commercial branches of aviation in 1930. The companies that have a sound backlog of transport business, military business or export business are likely to be more fortunate than specialty companies manufacturing a narrow line of commercial machines."

Sherman M. Fairchild, president of Fairchild Aviation Corporation, believes that there are between twelve to fifteen hundred planes unsold in the hands of manufacturers and dealers. He further observes that the market is now saturated and that price cuts do not seem to stimulate sales. More important, Mr. Fairchild sees no factors in the industry which would lead him to believe that "more than a reasonable increase" in sales next year over this year should be expected. His major point in favor of this contention is that aviation is still expensive, saying, "One of the problems of the industry is to make it cheaper and so bring flying within the reach of the majority of those who would like to fly."

Harvey Williams, President of Air Investors, states: "There is certainly a depression in sales. Part of this is attributable to normal seasonal conditions, part of it seems to be due to the fact that flying is not comfortable to the average citizen and part of the apparent depression is due to early estimates of high volume production and sales which were out of line with probabilities and which consequently make actual production and sales seem somewhat small, although they are at a substantially higher level than for the year of 1928."

Mr. Williams concludes that a seasonal drop may be to some degree expected, but that sales may be greatly stimulated by paying more attention to the needs and desires of the public. More comfort and diminished noise for those who use the transport lines, and simplicity and ease of handling in the small plane division.

AERONAUTICS should not be misunderstood as believing that the entire market is going to drop out of the aircraft business. On the contrary, we are inclined to agree with Mr. Vaughan, who sees nothing unsound in the prediction made by another able leader that 150,000 planes would be in use by 1934. The very nature of aviation, its sound economies and efficiencies, its significant appeal to the imagination of mankind, would alone make the gigantic future of the aircraft industry inescapable.

It is this immovable background of faith in the great future of this new art, science and business that causes us to be appalled by the present backsliding condition.

Those few men of far vision who have crept into this industry and, in a number of cases captain large companies and combines, are being actually and actively blocked by many of their own subordinates.

This business will not travel very far and will be subject to the present worrisome vacillations, as long as those in actual contact with the public maintain their present diffident attitude. To be a major industry requires active belief and participation on the part of the substantial public—the housewife, business man and even schoolboy. The narrow assumption that it is only worth while to attempt to sell those at present constituting the industry is deadly to the growth of this business.

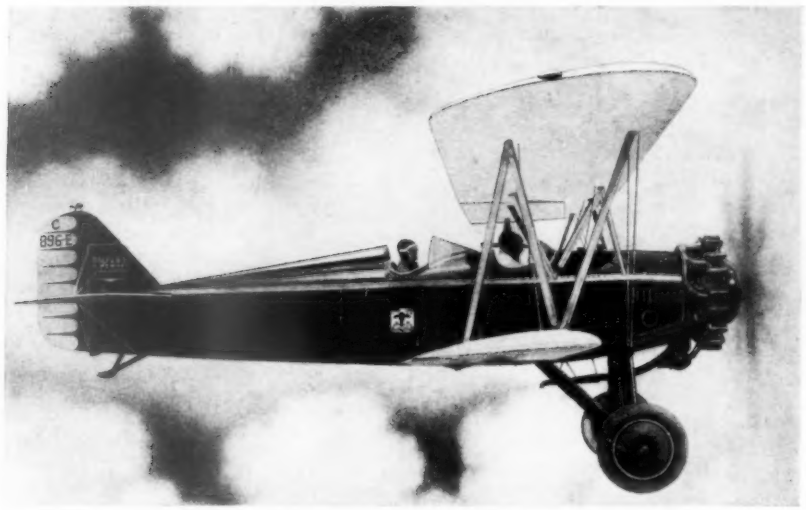
The newspapers are vitally necessary for the full maintenance of public relationship. Instead of being antagonized by the haughty self-seeking attitude of pilots and others, they should be encouraged to consider flying a normal art with normal hazards, and not the exclusive possession of heroes. As Ernest Jones points out in a statement to appear next month, the perpetual squabble over the question of reporting accidents should end with the industry agreeing to aid in the reporting of uncolored reviews of causes in all accidents. This would shortly cure the present news tendency towards sensational distortion. Also, it should not be forgotten, that newspapers once convinced that this industry is sound enough to form an eventual advertiser will put themselves under their own restraint in presenting the news.

Much attention should be paid the women of the nation. Their unfavorable reaction to aerial travel will effectually prevent the menfolks from using the skyways. If the public can be taught that flying is a thoroughly normal proceeding and the industry relieved of a lot of people who believe that it is a sort of exclusive club requiring a birth certificate and noteworthy credentials to enter, there will be no more abnormal depressions. These recessions are direct evidence of the miserable job the industry is doing in selling itself to the nation.

If the industry will lose a fraction of its smugness and get rid of a few of the childish "shows" encumbering its time, and sell the ordinary traveler and shipper on the values of aerial transport, it will have taken a long step forward towards solidifying its position. Transport com-

[*Continued on page 84*]

THREE OF THE LATEST



THE Butler Blackhawk (left)—designing by Waverly Stearman and engineering by M. C. Baumann—is a neat appearing three place open job for standard performance. Powered with a Wright Whirlwind motor, its top speed is 130 m.p.h., cruising speed 110 m.p.h. and cruising range 5 hours with a useful load of 1040 lbs. Comfortable leather upholstery and good visibility are evidence of an eye to the point of view of the feminine and sport flyer.

THE latest Barling NB-3 (right), powered with a Velie 55 h.p. engine, is planned for student, sport and passenger use. A new landing gear, designed for hard knocks, is an important feature, as is a worm type gear adjustable stabilizer. The machine has a cruising speed of 87 m.p.h.

THE Baby Ace (below), a single place cabin job soon to be placed in production. It has a wing span of 28'8", height 6' and length 17'5". The little plane has attained a speed of 85 m.p.h. with a Szekley, 40 h.p. 3-cylinder engine. A low landing speed is claimed as one of its outstanding features. The interior of the cabin is in 2 color leatherette.

VIOLETTE, Vicomtesse de Sibour, a sketch from life by Louis Szantoz for AERONAUTICS.

VAGABONDING BY AIR

by Vicomte de Sibour

THE great mass of people, even in this enlightened age, look upon flying as a dangerous game. It is a curious thing that the thousands of flights that are carried out successfully fail to erase the impression that one disaster engraves upon the public mind. Almost every accident that occurs can be traced in some way to the pilot's own fault, lack of judgment, a wish to show off, risking bad weather, inattention to details being among the causes that might lead to trouble.

But I consider that, if one minimizes the risks as far as one is able to, flying can be a safe and agreeable sport. It was to illustrate this theory and to combine a holiday jaunt that my wife and I decided on a trip round the world. Strictly speaking, the idea did not quite originate like that. We had been discussing big game shooting and I had announced an intention of hunting tigers in the wilds of Indo-China. My wife, who generally has some amusing and highly impractical observation to add to any discussion, blurted out: "Why don't we fly there?" For once it seemed a feasible proposition, and I think I rather surprised her by taking her suggestion seriously. There were a thousand things to consider, of course, preparations to be made, work to be got through.

I surrounded myself with maps, naval charts and books of reference. The air ministries of both France and England were delightfully helpful. It was when going into the weather conditions that we discovered that bad storms and monsoons would meet us on the return journey, and we decided on the obvious course of proceeding eastward all the way and shipping the two big oceans.

The first consideration, naturally, was the plane itself. After studying the separate merits of many types of machines, we came to the conclusion that, for the trip we proposed to take, our own tiny "Moth" aeroplane could not be bettered. We made a few additions and alterations, such as slotted wings, reserve petrol tank, extra instruments, and then exchanged our own Cirrus engine for the newer and more powerful Gypsy.

The Gypsy develops 100 horsepower and has an average cruising speed of 80 miles per hour, using about one gallon to 15 miles. With the second tank full, we could make a non-stop flight of 7 hours. That seemed good enough. The Shell Oil Company fueled us efficiently throughout, laying dumps where necessary, even in the most inaccessible places.

My maps were prepared in book form, the separate sheets pasted on aluminum and varnished, after I had marked my magnetic courses, declination, and any remarks. This process proved highly satisfactory, as neither use nor weather conditions were able to spoil them.

The question of luggage very nearly brought on divorce proceedings. "Fourteen pounds is all you can have!" I said, and remained firm on the subject. My wife had to make up for the deficiency by very ingenious planning. I must say she managed pretty well, for her three frocks seemed to meet every occasion, although, at the end of six months, both our wardrobes began showing signs of wear.

Several times did we change our minds on the route we were to take out of Europe, finally deciding to go down through Spain to Gibraltar, on to Tangiers and Fez, and, from there, to follow the coast of Northern Africa all the way to Egypt.

After Cairo there was little choice of ways. All Eastern bound aircraft are obliged to pass through Bagdad, and via the Persian Gulf to Karachi. One could make as zig-zag a course as one pleased across India, but from Calcutta on there is but one line to take. It was not always easy to obtain the information I needed. Hardly any small machines had attempted such a trip. Ours was not a record breaking attempt, just a leisurely wandering over the face of the globe. If bad weather threatened, we would put off our departure; if we found a place to our liking we would stay a while. Our letter of credit was the only thing that put the slightest break on our adventure, and, as far as that was concerned, I am convinced that our mode of traveling proved far more economical than any other, that is for two people.

Apart from the original cost of the plane (which is that of an average motor car), we spent about £2,200—or $11,000—that included cost of petrol and oil, five

[*Continued on page 54*]

Young cosmopolitan sportsman, recently married to Violette Selfridge, who accompanies him on his peregrinations.

IN THE FLOODLIGHT

A MONTHLY REVIEW OF A FEW OF THOSE WHO HAVE RECENTLY ADDED LUSTRE TO THEIR NAMES ▲▲▲

Lieut. Jimmy Doolittle who has contributed to our fund of flying knowledge with a blind flight relying solely on his instruments.

Fritz von Opel, heir to German motor millions, who recently made an epochal flight in a rocket propelled plane.

Lady Mary Heath, who for many years has retained the admiration of two continents for her indomitable grit and fine sportsmanship.

Ward T. Van Orman many times winner in balloon races who has become ground school director for Goodyear-Zeppelin.

A range of Rockies seen from the air.

THIN AIR FLYING

by Ralph N. Miller

FLYING in high altitude country is in a class apart from the general run of aircraft operations. Taking off and landing a full load, day in and day out, at an elevation of 6,000 feet, requires a pilot familiar with the rarefied air and how it affects his flying.

A light plane in the 6,200 foot altitude of Colorado Springs, Colo., for instance, handles something like an overloaded plane at sea level. The take-off is slow and the plane acts loggy on the lateral controls. Landing, the plane comes in faster than an army pursuit at lower elevations, and once the pilot "gets his tail down," he should be on the ground for his flying is over for that hop. Of course, a strong, steady wind will enable him to float just off the ground for a short time. But on a still day, the ship has a tendency to drop out from under one as soon as it begins to lose speed.

Climbing turns are never attempted near the ground, even by transport pilots who know their planes. Chaundelles have been tried on the take-off with regrettable results. Students are taught not to bank over 30 degrees under a 200 foot altitude, unless it be absolutely necessary to turn sharply to avoid pushing a mountain off balance.

Possibly the highest flying school in America today, maintaining a number of training planes and transport pilots the year around, is operated by the Pikes Peak Air Commerce, Inc., at the Alexander Airport, Colorado Springs. The airport is 6,200 feet above salt water. The air above it is 20 per cent lighter than at sea level. Thus an airplane is just 80 per cent as efficient in the Pikes Peak region as, let us say, in Connecticut. The comparatively low atmospheric pressure so affects motor carburetion that the power plant develops at least 20 per cent less power than at sea level, whereas by rights the plane should have that much more "soup."

A sea-level pilot, making his first high altitude hop, will awake with a rude jolt on landing to find that the ground air has lost its cushioning effect. Once leveled off with motor idling, he settles almost immediately. It is impractical to try to stall over fences or wires with the throttle cut. The practice is to gun the motor at the first intimation the plane is undershooting.

Naturally, it would be supposed that the mountain country offered about the poorest possible site for a flying school. Not only is the risk on the equipment greater, one would say, but the student must take more time and spend more money in order to acquire his license. These factors are admittedly true. Nevertheless, the advantages of learning to fly in thin air so counterbalance the drawbacks that the Pikes Peak school and several other large Rocky Mountain schools are enjoying a healthy, year around growth.

This paradoxical development is due primarily to the fact that a pilot trained in high altitude country is a more finished, more conservative and more confident pilot than one who learns the art in the thick air of the low countries. At least that is the theory advanced by O. M. "Red" Mosier, one of the country's veteran pilots, who is president of the Pikes Peak School.

Learning to shoot three pointers at 6,200 feet, with the wind shifting direction every fifteen minutes as a result of the gnarled topography of the surrounding country, will make a pilot qualified to fly anywhere and land everywhere possible. "Feel" flying is ingrained into the student. His horizon is usually an uneven range of lofty mountains, and cannot be used to check the ship's angle of attack. His landing field is often between high buttes on one side and mountains on the other. Downdrafts at the leeward end of a field are an almost daily occurrence. The student learns to nose down and gradually turn to where the ground drops away, when caught in a sinking shaft of air. It is almost impossible to pull out of one. The plane stalls and spins in from a low altitude.

One of the first lessons taught a student at the Pikes Peak school is to fly

his ship off the ground, and never pull it off. Consequently he always maintains a good safety margin of flying speed and in event of motor failure on the take-off, has enough reserve speed to nose down and glide to a dead stick landing.

Too many preventable accidents are caused by an over confident pilot hanging his ship by the prop on the take-off. He does not fear a power stall, because experience has taught him that by "keeping his tail behind him" with the rudder in a power stall, he can prevent a spin. His plane will mush down a little and he can pull out of it with the motor. However, sudden motor stoppage on a steep climb will leave him "standing on his tail," the ground sixty feet below, and not a chance in the world of preventing a headlong dive or spin into the ground.

A plane stalls much easier at high than at low altitudes. Consequently student pilots in high altitude schools are of necessity more careful about taking off and are less inclined to stretch their glide in trying to reach a field.

The story is widely circulated of the high altitude flier who ferried a new ship from a factory back East. This pilot was accustomed to landing fast in the thin air. Arriving at his destination near the east coast, he sat down on what he considered a perfect three point landing. Turning to taxi back to the hangars, imagine his surprise when he found he still had 25 feet of altitude.

Frequent flying over mountainous country where a dead motor means a washout teaches students that the old power plant is their best, yet sometimes treacherous, friend. Naturally they are always on the qui vive for a dead motor and form the valuable habit of spotting emergency fields ahead as they fly across country.

It must be remembered that new production airplane motors are among the most dependable pieces of mechanism ever devised. The air-cooled motors of the Question Mark and the Fort Worth ran continuously for over a week. Given proper care, only the most extraordinary piece of tough luck will cause a new production power plant to let a pilot down on bad country.

Nearly every mail line in Western North America crosses at least one range of high mountains. Only pilots with high altitude experience are trusted on these runs. Students trained in thin air are pre-eminently qualified for this service. Recognizing this fact, a number of limited commercial and transport pilots are now piling up high altitude hours at the Pikes Peak school.

Three washouts in nine months taught one high altitude institution the futility and ultimate expense of trying to instruct behind the nearly obsolete Curtiss OX5 motor, an old war-production standby now being replaced by lighter, higher powered, more serviceable but far more expensive engines. Of course, the economy of this type lay with its low initial expense. A light plane, with such a motor, above 5,000 feet, is underpowered unless the school happens to be operating off a large field with runways and open country lying in all directions.

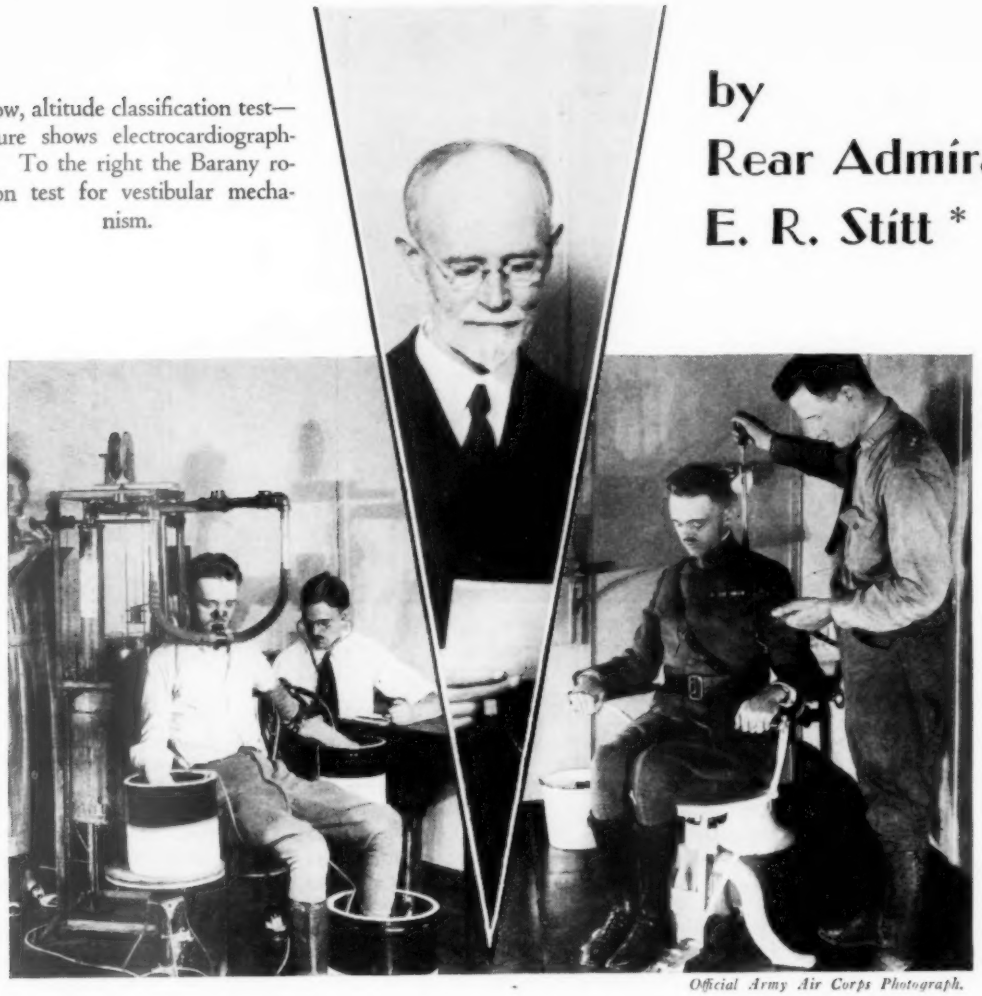
Instances are known of pilots taking off with a full load in such a job and having been forced to fly a twenty mile circuit, unable to climb higher than 20 feet, in order to get back to their field. Such a nerve wracking experience may be expected on a hot day, when the heat has expanded the air, making it less dense and aggravating the effect of altitude. Flying twenty feet off the ground, a bank of any perceptible degree might lose enough altitude to wash out the plane. "Light as a feather," old pilots call the air on such a day.

To gain plenty of reserve power, high altitude schools are now using higher powered motors. These engines are heavier than their less powerful counterparts, and consequently their installation results in a heavier plane. A heavier plane means a faster landing speed and more skill required to land it. A combination of 150 horsepower, wing area of around 330 square feet, and a gross weight of about 2,500 pounds, has been found most practical for flying at a 6,000 foot altitude above sea level.

Such light planes with unusually large wing area and a high lift wing are used almost exclusively in high altitude schools. An example of this type of plane is the Eaglerock, which is manufactured in the high altitude region and designed for performance at all elevations.

The old barnstorming, gypsy flyers of five years ago developed into the best pilots of their day, chiefly because they had to fly and land in small fields, often hedged in by wires and housetops. They learned to handle a plane under all manner of difficult conditions. This bred self reliance and cool headed flying in the face of unexpected eventualities. The same factors enter into the training of a student at high altitudes. Consequently many earnest young men are entering the high altitude schools. Operators of these schools claim that their graduates are of the highest standard in the country.

The mile square Colorado Springs Municipal Airport—situated 6200 feet above sea level. The Barrier Range of Rockies in the background.



Below, altitude classification test—picture shows electrocardiographing. To the right the Barany rotation test for vestibular mechanism.

Official Army Air Corps Photograph.

by
Rear Admiral
E. R. Stitt *

PHYSICAL FITNESS AND FLYING

PILOTS who cannot think and act almost automatically will be unable to meet the sudden emergencies that sometimes occur. These need not be always serious emergencies, yet they may be of such a character as to demand right thinking and consequent correct positive action.

It is essential to know always whether the military or naval flier or the transport pilot is in the proper condition, physically and mentally, to re-act properly to any unusual situation. In other words, he must be both cool and analytical at all times.

Different persons have varying views as to the most essential attribute for a flier, if indeed there be one more important than any other.

During the war the specialists in medical aviation attached the greatest importance to the normal functioning of the internal ear, as determined by turning tests in Barany chairs, for upon this depended the surgeon's estimate of the candidate's sensibility to equilibrium. At the same time the psychologists insisted that methods for ascertaining the temperamental qualities of a candidate for aviation were paramount.

Later on various eye tests, particularly those connected with ocular muscle balance, were stressed by the flight surgeon.

Now, however, we find various countries stressing various tests. The British have a breath-holding test for air service applicants which demonstrates among other things the ability of an individual to hold on until he figuratively is "black in the face." Thus he has grit!

The British also attach great importance to a good sports record, but at Pensacola there seems to be no particular relation between athletic reputation at the naval academy and ability to fly. On the other hand, it was noted at Pensacola that a good golfer became a better pilot than a poor golfer. I would not have fliers attempt to lower their golf scores thinking thereby to improve their skill in the air. The conclusion would not necessarily follow.

Medical examiners of the world can determine a flier's physical fitness fairly easily and according to standardized rules. More and more, however, the importance of the psychological reactions, the ability of an individual to adjust himself easily to the conditions of flying,

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* Surgeon U. S. N. since 1900. Specialist in tropical medicine, and author of numerous books of authority on bacteriology, etc.

Official Army Air Corps Photograph.

To the left, muscular balance test. Right, observing capillary circulation.

becomes recognized. As yet no machinery for weeding out the temperamentally unfit at the inception of their flying careers has been perfected.

At times since 1920, it has seemed to me that our flight surgeons were inclined to accept eye muscle balance as the outstanding qualification in the pilot candidate. Yet the specialists at Pensacola have failed to note any superiority in student pilots who just pass the various eye tests with those who have little or no defect. This would tend to show that the navy surgeons have not erred in the direction of lowering standards.

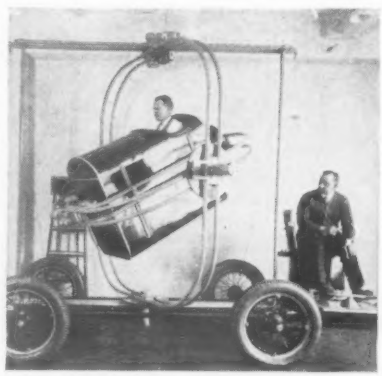
Whatever be the most necessary qualification of a flier, each pilot in military service must be carefully watched to see that he is fit whenever he makes a flight. This question cannot be left to the individual aviator, nor to his immediate superiors. It is a question of psychologic and physiologic fitness which can be determined only by specially trained men known as flight surgeons.

Medical men cannot know of the conditions faced by fliers unless they fly, at least some of the time. A fortiori, laymen or doctors, cannot prescribe rules by which aviators are selected unless they fly, at least some of the time. I recall in starting to provide the American navy with specialists in medical aviation, during the latter part of 1920, that there were some differences of opinion regarding the value of flying to a flight surgeon. These differences had to do with the length of training rather than the fact of training. In most nations today flight surgeons undergo some training as pilots. If it has no other value it helps gain for them the confidence of pilots reporting for tests or treatment.

On the purely physical side of examinations, different services stress different tests. In the British air service great importance is attached to a test wherein the candidate without rebreathing maintains a column of mercury at 40 millimeters by blowing through a rubber tube. The time the test can be sustained and the effect on the pulse rate gives valuable information on cardio-respiratory efficiency.

Our own flight surgeons now are considering adding some type of breath holding test to the Schneider index, which is made up of six factors: pulse rate reclining, pulse rate standing, difference between the two rates, effect of exercise on the two rates, time of return of standing rate following exercise and the difference between reclining and standing systolic blood pressure.

Whenever there comes a question as to the physical condition of a flier in certain commands this test is given. The



The faithful old Ruggles Orientator.

fact that it gives a definite numerical result appeals to the aviators.

Reaction time tests have met with varying views. European flight surgeons attach considerable importance to tests for reaction time, but in the United States these have not occupied an important place. Certainly, however, reaction time has a definitely measurable value.

Two machines—the Reid control and the Ruggles Orientator—have been of considerable service in helping establish these values. In the Reid control, possibly not as well known as the Ruggles Orientator in this country, the candidate sits in a cockpit similar to that of an airplane and operates the controls which when in neutral stop the current to the graph attachment, and when not in neutral allow the current to pass. The time required to bring the controls in neutral is recorded as is also over-controlling. There is also added auditory disturbance, such as blowing a horn, behind the candidate. The British have great faith in this apparatus in the selection of pilot candidates.

The French have been very enthusiastic about reaction time tests, not only response to auditory, visual and tactile stimuli, but even recording reaction time to changes of position.

The Italian flight surgeons conduct with great thoroughness not only reaction time tests, but also those determining equilibrium and eye muscle balance.

About a year or so ago we began experimenting with a simple reaction time and coordination determining test, which we got from Doctor Rippon, of the Royal Air Force—the dominoes test. After

[*Continued on page 60*]

SELLING THE PUBLIC AIR TRANSPORTATION

by

J. L. Maddux

President, Maddux Air Lines

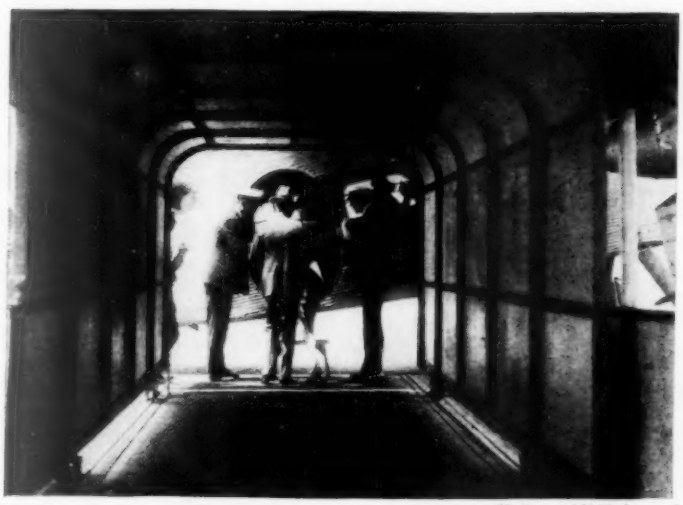
AVIATION has passed through two stages and now has entered the third. While we think of this as the commercial aviation age, a century from now the world will think of this period as the time when commercial application of flying had hardly begun.

Although airplanes have been developed to the points of safety and relative economy, there remains the problem of selling and re-selling individuals on transportation in the air.

Those who think of aviation in terms of war-time flying—and many do—have ample reason to keep one foot on the ground. They continue to think of flying as belonging to one of the first two stages. Nothing could be farther from the truth.

The first of these may be termed the pre-war stage. Airplanes then were little more than power driven kites. Piano wires of sometimes doubtful strength served in place of the fine stream-lined wires on biplanes today. No wonder only careless youths were willing to trust their lives aloft!

Then came World War aviation. Engines began to display a certain degree of efficiency and trustworthiness. Those motors when compared with the excellent engines now used to power transport planes become very unreliable indeed. Some of the best war-time motors were rotary in type. The entire engine revolved! They could not last under high speed operation. Some of these motors had no piston rings, but utilized small copper rings much like the leather washer in a bicycle pump. There was so little compression that the propeller would continue to turn even after the pilot had cut off the ignition.



Underwood & Underwood

New movable canopy runway at Grand Central Air Terminal, Glendale, California.

That was scarcely more than 10 years ago. We now have entered the age of commercialization of travel in the air. It has ceased to be a "game" and has become a "business." It will become a bigger business only as the public patronizes it.

How can the public be induced in large numbers to fly from city to city, then to fly again, again and again?

I fear the safety element is being overemphasized. Those engaged in the manufacture of airplanes and transportation assume air travel is safe, but many follow the assumption with long arguments to prove the point. If air travel has become an accepted means of travel it should be sold on the same basis any other transportation is sold. That is, on its economy, comfort, speed and dependability.

The safety element need not be ignored, however. Published figures of performance, statements of on-time arrivals, information concerning the care taken to insure on-time arrival; these things carry the connotation of safety without continually driving in the thought in a manner which suggests it to be only a half-truth.

Air transportation companies stand on the threshold of a large volume of business. The volume must be developed much as the railroads increased passenger traffic. The temporary affluence of some companies possessing valuable mail contracts is passing and airplanes are assuming their place in the general transportation scheme alongside trains, stages and steamships. The whole public becomes the market.

Air lines first began seriously to bid for the public's confidence and patronage shortly after

Powhatan Studio

Lounging room, Pilot's Hotel, Municipal Airport, Tulsa, Okla.

Colonel Lindbergh's trans-Atlantic flight. The business in its early development has been largely a gamble. The air transportation industry has had no precedent on which to predicate plans. There has been no aviation traffic history to study. That history is now being written that our successors may profit.

We could not pattern plans after the European methods. The United States government offered no subsidies except in the form of mail contracts to a limited number of companies and certain other aids of less material nature. European air lines have had the benefit of direct government subsidies, use of government pilots and other similar assistance. American companies generally have been required to develop their own resources.

Large sums have become available through public subscription for development of the better companies. In some instances the public has not discriminated, in fact has been unable to discriminate. Whether the investments prove their worth by returning profits to investors depends upon use of the facilities by paying customers.

To induce potential customers to come to our air depots and later to use our planes in business and pleasure becomes the next important problem.

It has been our experience that familiarity breeds contempt for the supposed dangers that exist in the air. One aged man of my acquaintance recently went from San Diego to Seattle by boat. He had taken this means to escape several train changes, thinking by this means he could avoid the discomfort of moving an injured knee more often than might be necessary.

Rough weather on the voyage north caused him to decide to seek another way of returning to southern California. During his stay in Washington he visited some of the flying fields several times and finally became a daily visitor at one large airport. The casualness with which younger people entered the big passenger planes and flew away over the mountains impressed him. His decision was not wholly unexpected. He flew from Seattle to San Francisco by one line and from San Francisco to San Diego in two of our planes.

"I never enjoyed a more pleasant journey," he said later. He explained that the roomy passenger cabin of the large tri-motored planes gave him as much comfort as he had experienced in other vehicles, and by flying he traveled

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Luggage being unloaded by attendants at Malmoe, Sweden.

Aeronautic Law

by Bailey Samelow

Well-Known Member of the Chicago Bar Continues His Earlier Discussions on Legal Problems Peculiar to Aeronautics

"A" OWNS a farm. "B" owns a lot in the city. "A" claims that his title vests in him ownership in the land to the center of the earth and gives him air rights over his farm to the limits of the sky above. Likewise with "B."

"C" owns an aeroplane. Has "C" the right to fly his aeroplane over "A's" farm or over "B's" city lot?

According to an ancient maxim recognized as the common law of England from the reign of Edward I, who lived from 1239 to 1307, "Whomsoever owns the soil owns also to the sky and to the depths."

According to Roman law, the proprietor of the soil has no right in the space above.

According to early French law, the owner of a piece of land possesses absolute and exclusive rights upward without limitation.

It seems that even as late as 1910 such countries as France, Germany, Switzerland, Italy, The Netherlands, Belgium, Spain, Portugal, Austria, Japan and Turkey used the English and French maxim as the basis for their aerial law—that is, the law implying that the space above, like the earth below, is subjoined to the surface of the land owned by a man—and only after 1910 did they begin to show, in their new laws, that such a basis was entirely incompatible with modern progress.

Until aviation attained universal attention, the question of air rights became involved only in such cases as overhead telephone wires (Butler vs. Frontier Telephone Co. (1906), 186 N. Y. 486); overhanging trees (Grandona vs. Lovdal (1889), 78 Cal. 611) and (Tanner vs. Wallbaunn (1898), 77 Mo. Appeal 262); extending eaves (Codman vs. Evans (1863), 89 Mass. 431) and (Corbett vs. Hill (1870), 9 L. R. Eq. 671, English case); and target practice, all of which were enjoined as nuisances or as trespasses.

In the English case of Clifton vs. Bury, 4 L. T. R. 8, the Court had before it the case of target practice across private property, the flying bullets passing entirely over the plaintiff's land without touching it, and held no trespass was committed.

With the development of aerial locomotion to a degree of universality, air rights attained an importance to heights never before considered.

Cases soon began to appear in the court dockets. Judges had to make decisions in a perplexing field. They were put in positions to do some thinking in a new light. It became obvious that the old maxims were inapplicable. Their literal interpretation would have killed aviation, as all aerial passage would have been trespass.

Law is still a conservative philosophy. Judges dislike giving up maxims. They just dote on precedents. Few dare to be original. Departure from established rules seems to be a metaphysical crime with the old jurists.

The fact that many of our law makers are lawyers reflects itself in the many old-fashioned laws on our statute books. The worst man to send to a legislature is a lawyer who thinks he must be guided by precedents.

Progress has attained great momentum. Life is expanding rapidly. Man's achievements transcend the imagination. Science, one of man's great products, floods the world with new light. Even jurists of metaphysical bent must yield to progress. The courts could not possibly uphold the old maxims. The laws recognized in 1910 had to be ignored, much as the old judges would have liked to honor them. One after another, decisions came out in favor of aviation.

The French courts love precedents. The early French law says the proprietor of the soil has an absolute and exclusive right upward and without limitation.

In the cases of Brinquant, Mauge, et al. vs. Farman (Revue Juridique, 1912) and Huertebrise vs. Esnault, Farman, et al. (English Law Times, 1914), the plaintiffs, small farm owners, were annoyed by low flights over their lands by planes taking off and landing at air ports adjacent to their farms, and by attracted spectators who damaged their crops. They sued for damages, and also to enjoin continuation of the flights, landings and demonstrations.

The decisions reveal a new view; injunctions were denied, but damages allowed in both cases. The opinion of the court in the Huertebrise case, expressive of the attitude adopted by the French courts at the present time, is as follows:

"If in terms of the texts cited, ownership of the soil carries with it effective ownership above the soil, this principle must restrict itself reasonably to the advantage of the proprietor according to the heights of the air usable by him, either in the way of buildings or accessories of buildings, such as architects and engineers *can conceive and realize*, or from the standpoint of cultivated land generally. As to that which is above this height, estimated and fixed according to knowledge and experience, and deduced from common sense, scientific rules, and the special circumstances of each case, the freedom of the air is complete. *Circulation Arienne* (that is, passage through the air) is in the present state of the law free from all restraint, and should not call forth new claims on the part of the proprietors of land over which flights take place."

Note the new implications. The freedom of the air is complete. It belongs to no one individual. The owner of a piece of land has no claim upon the air beyond a level that can be of use to him; it is not his to the sky above. He can build upon his land structures as high as he wants to, but he cannot restrict the use of the air above his structures. That is common property, which may be used by any person in orderly pursuits.

The restriction relates to orderliness. A person flying over a proprietor's land must observe the common sense laws. He must be careful not to cause damages or injuries to the property and persons below. The aviator is subject to damages; he is liable for misconduct recognized as a nuisance.

What a triumph for common sense law—and what a rebuff to musty maxims! The world doth move.

England gave King Edward's maxim a "solar plexus" in 1920, when Parliament passed a law known as the British

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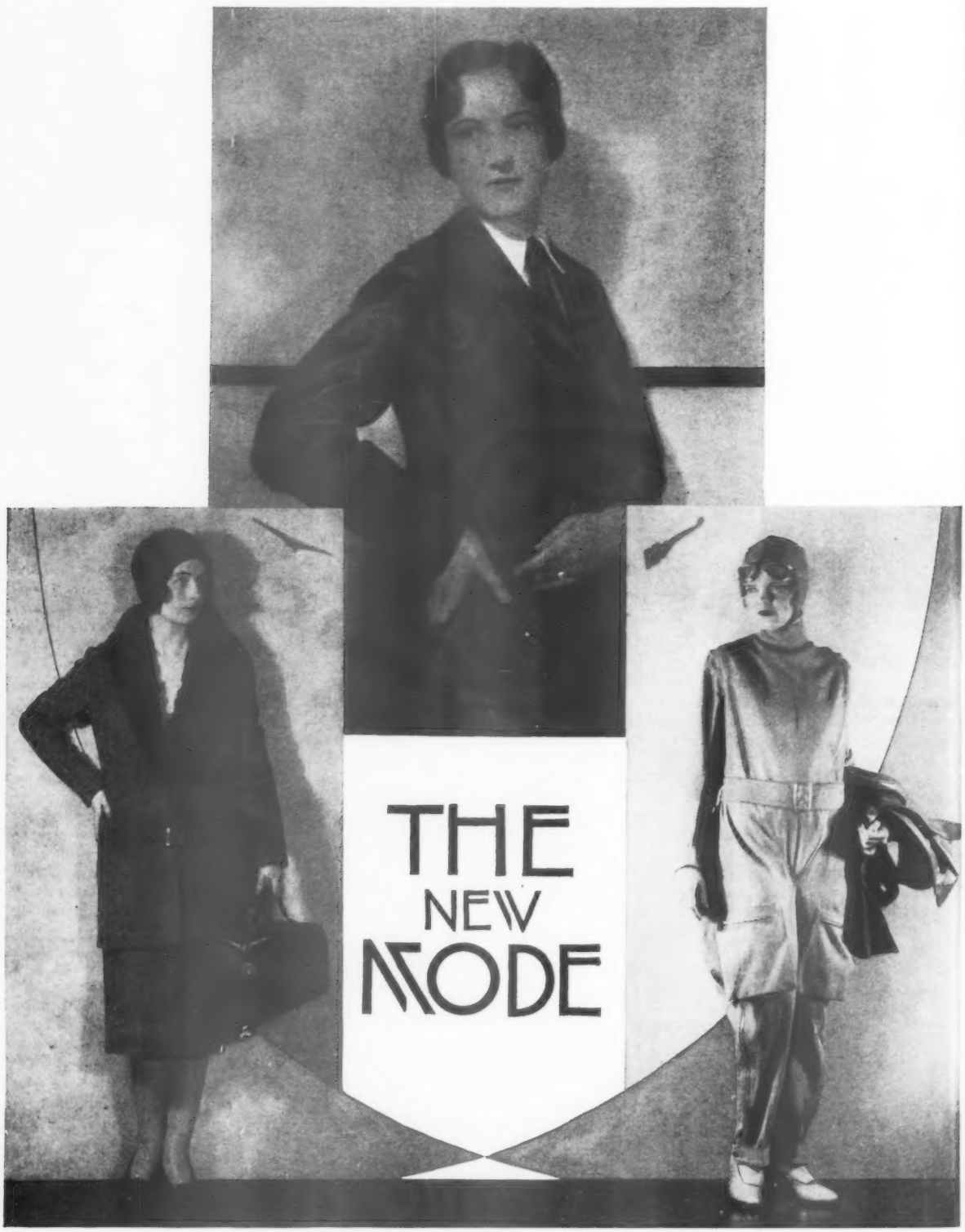
The attractive airplane passenger to the lower left, is wearing a brick red tweed suit with black caracul shawl collar, tuck-in sweater, black soleil hat, and is carrying compact airplane luggage.

Mrs. Justin Dart, formerly Miss Charlotte Ruth Walgreen, wearing an attractive leather aviation coat. The Walgreens have owned several planes in the past and recently took delivery on a new Sikorsky. Pictures on this page posed for AERONAUTICS *by courtesy of Marshall Field & Co.*

Lower right, for the young woman pilot. This suit of beige gaberdine with zipper fastenings, green leather jacket and tight-fitting skull cap with goggles, makes a pleasing ensemble.



WOMEN AND AVIATION

by Swanee Taylor

Announcer at the Cleveland Races and pilot extraordinary.

Ruth Nichols

ANY woman can do anything she wants to do—provided, of course, that she wants to bad enough. And that includes aviation!

This observation, gentle reader, comes to you after years of deep study and extensive research—handling the subject, as it were, right at close hand. Yes, siree, your reporter has, with a corps of assistants, doggedly carried out many experiments with woman in her various and sundry moods.

In our search for knowledge our labors often kept us awake far into the still night watches. For, we soon found out that women always react much better after nightfall. The fruits of our aggregate study, as found in this paper, take the form of giving you the real low down on women associated with aviation. It is regrettable that we cannot give you all of the low down we discovered, but then, after all, AERONAUTICS is a technical magazine. Maybe someday the publishers of Sloppy Stories will approach us to give you some of the other angles.

However: All womanhood can be divided into six general classes: We have the Dependent Woman; the Athletic Girl; the well-known Flapper; the "Little Lucy," or Timid Type; the Talkative Woman and the "Good Egg." Yet, despite the wide range of temperamental qualities in the six classes, they have one point in common—that of determination. I will go a step further and say, positively, that the ruling quality in every woman's make-up is determination.

The very essence of her life is making up her mind to do a thing, and then carrying out her purpose regardless of hell or high water. Believe it or not, the weakest of weak sisters possess more grade "A" determination than most strong men. But we won't go into that now. My point is this: That unquenchable will to master the art of flying—which is a vital requirement of every student—lies within the powers of every daughter of Eve. Lamentably though, the spirit of resolution alone won't do. That is, it won't by itself assure success in commercial flying. The various other feminine characteristics and traits crop out to cause the literal downfall of many a fair aspirant. But then, on the other hand, there are a good many men who do not possess the, shall I say "dizzy," temperament that goes to make a pilot. So then, your reporter has not indicted womanhood at all. And, what is more, he never will.

At the present writing, we happen to know, the Curtiss Flying Service is rapidly expanding its women's department. This department's function is to carve a niche, or niches, in the industry so as to furnish employment to gals who graduate from the various Curtiss Flying Schools. They have already started one recent graduate on the road to becoming an aerial school marm. And Frances Harrell will become an airplane saleslady as soon as she gets back from the National Air Tour (nee Ford).

There is no reason in the world why a woman can't give flight instruction, if she herself can really fly. And we need not fear that the students of women instructors will become effeminate in their flying. Although I do believe that many of the boys will conjure to be made to stay in after flying school with teacher. And, in the matter of sales, what, I ask you, could be a more forceful sales point than having a plane flown in demonstration by a winsome and utterly charming

Katharine Stinson Elizabeth N. Warner Elinor Smith Phoebe Omlie Amelia Earhart

young lady. (Ah there, Frances!) They ought to go like those hot cakes they are always talking about.

ASIDE from flight instruction and ship sales, there are several other lines of endeavor which keep the girls amply supplied with chiffon hose and those other little things that go to fill up the female cup of joy. We all know how Phoebe Ormile has for years been helping her husband carry passengers along with other flying chores. Remember how they both covered themselves with glory by doing much splendid rescue work during one of the annual Mississippi floods? Phoebe did her stuff right along with her husband, and she did it swell. Then there is little Lieutenant Elinor Smith who has earned many an honest dollar flying exploitation and advertising features. Right now she is touring the nation in a Bellanca cabin ship, demonstrating the product of a certain parachute manufacturer. (I mustn't say the Irving Air Chute Co., that's free advertising.)

The air circus field has long since been invaded by women pilots. Ruth Law and the Stinson girls long seasons back used to cause much sucking of breath among the natives with their startling stunt exhibitions. Airplane racing, with luscious prize moneys in the offing, has taken the eye of m'lady. Witness the recent Cosmetic Caravan, better known as the First Women's National Air Derby. They made those brave girls fly over just about the toughest course possible, except the North Atlantic. And how they flew it! And we mustn't fail to point to the profitable literary fields attained by Amelia Earhart. Nor shall we overlook the wonderful work done by Ruth Nichols in furthering the social side of flying. But I stray afield. Here I am, recounting names and accomplishments, instead of earning my fee for giving a pilot's views on women and aviation.

Getting right back to the business of this meeting, permit me to deal singly with the six general classes of women outlined above. This is done so as to cover the field thoroughly.

First, the Dependent Woman:

This type generally decides to learn to fly after having flown as passenger with some snappy-eyed aviator at a nearby flying field. It generally happens that he is a new pilot there, a male endowed with curly hair, or flashing teeth, or some other physical attribute which attracts little Miss Ivy Vine mightily. She is smitten, and therefore yearns to be in the immediate vicinity of her new-found idol. And when a woman begins to yearn it is a signal for the Old Man Determination to get right up and start working.

At first she hangs around the field, tossing out lure until she exhausts her entire store of wiles. Then, seeing that John Pilot isn't going to rise to the bait, she enrolls as a student in the school. Prior to the first hop, as is customarily done, the manipulation of the controls is carefully explained to her. But she doesn't hear a word of what is being said. As her hero explains the intricacies of the rudder bar to her, she stands before him in rapt adoration thinking about how stalwart he is. His voice becomes the voice of an angel, sounding far sweeter than mere mortal words.

After several explanations she is finally assisted into the ship. And I said assisted. She is so helpless, so dependent, so absolutely powerless that she cannot climb into the seat and sit down by herself. A disgusted mechanic accomplishes this by giving one mighty boost, and the force of gravity does the rest.

During the first couple of lessons she is just like any other student. That is, she is so vile in the air that it doesn't matter. But when, after the third or fourth hop, she doesn't start snapping out of it her instructor begins to get a mite provoked with her. And when it becomes apparent to him that she is not trying he gets downright cross. Incidentally, one has to learn one's own lesson in flying; all the instructor can do is to show you how it is done. The Dependent Woman rarely takes more than five or six hours of instruction. When her hero begins to scold he ceases to be a hero, and then there is really no sense in hanging around any more.

The Athletic Girl comes on the field with a look on her face which tells quite eloquently that she is willing to do and die for dear old institute. Mind you, I am speaking of the real hyper-athletic type. One of the kind who have muscular systems like Strangler Lewis, and who just adore to romp off on 20 mile tramps and things like that. She seeks in aviation a certain muscular strain and physical competition, and she constantly battles with the controls. As a result, the ship lurches and heaves about in the sky like a rubber ball gone berserk. Somehow or other she never realizes that the mechanics of flying are not spasmodic jerks based on the employment of heft.

Her muscle-bound nerves are incapable of feeling the smooth rhythmic motions that go to make even and undisturbed flight. Her determination lies in the general direction of piano moving, and she soon gives up the thought of an aviation career and goes in for something on the order of foundry work.

Now let us embrace the Flapper. But they say that they are pretty hard to embrace, at that, so we will merely take the case of the Flapper. Her entry into aeronautics is prompted by an appreciation of publicity values and histrionic leanings. Also, the spirit of youth has a lot to do with it. She approaches her instructor with a great deal of swagger in her manner, and her language is of comic strip acceptance of English as she is spoke.

"Come on, big boy," she barks, "give this little girl a hand full of this aviation racket. Wow, this is gonna be hot, me learnin' to fly. Golly Moses, I'll bet a buck or two that I'll be sproutin' chicken whiskers before long."

All of her instructor's remarks, both his questions and answers, are regarded with a fine scorn which is sired by an overbearing manner. The Flapper has a hard time learning to fly because of this

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The Misses Patricia O'Neill, Alice Cross and Frances Przymus with instructing pilot Ira Packard at Great Northern Aviation School.

by J. Don Alexander
President Alexander Aircraft Co.

THE AIRPLANE IN SALES PROMOTION

UNDENIABLY the airplane is coming into greater use as a sales promotion medium. A brief time spent at any metropolitan airport will startle the casual visitor into appreciation of this fact. Planes bearing the names and trade-marks of prominent manufacturers, dealing in everyday commodities, may be seen parked on the aprons, in the hangars, or warming up on the field preparatory to taking off.

This new development will receive marked impetus as better accommodations are obtained at airports. I mean the installation of sample rooms, hotel and restaurants, so that the "air drummer" can make several towns in one day, including no doubt one or two centers more or less isolated by poor rail and road connections. He covers three times the ground he would by auto, and can easily make three towns in the time otherwise necessary to work one properly.

The flying salesman or distributor wires his customer or local dealer that he will be at the airport at such and such a time. He scores a psychological advantage by having the party waiting to see him, rather than waiting to interview the customer.

By bringing the customer or dealer out of his office stronghold and to an unaccustomed spot the flying salesman gains command of his attention and can direct it to the sole purpose of looking at his samples.

Above, New Terminal Depot, Los Angeles, Calif. One of first salesmen's showrooms available for the Flying Salesman.

That type of contact is advantageous to the salesman rather than to the prospect.

In time this more economical way of selling merchandise will give rise to a series of sample rooms at all airports. Salesmen will drop in regularly to spread their wares before local buyers. Whole states will be covered by experts in a week's time. In this day of exceedingly close competition in all lines the sales costs usually determine the margin of profit. By covering territories quickly by airplane, manufacturers will dispense with large sales forces and be able to place star salesmen and technical experts at every sales point in quick rotation. The greater economies showing in the sales costs will be handed down to the merchant and his customer.

This system of coverage of course does not apply to the larger cities where the salesman may have several customers. Even here the airplane is of inestimable advantage as a travel time saver.

Automobile dealers have been quick to use aircraft in promoting sales. As a class they were swept into business on a wave of progress—they owe their industry to progress—and they look with an open and eager mind to every new suggestion and device. "Faces forward" is a slogan that goes in the automobile as well as the aircraft world.

An example is Floyd E. Barlow, Hudson-Essex distributor in the Black Hills district of South Dakota. Barlow was one of the first to envision aviation as a future sales help. He learned to fly in 1911 and piloted a Curtiss pusher ship at county fairs for the old Curtiss Exhibition Company.

In 1928, Barlow declares, he sold twelve new automobiles by use of his Eaglerock airplane. Without the ship, he writes, the sales would never have been made. He states clearly the advantages of an airplane to an automobile distributor in a large territory.

"In using my Eaglerock, I feel that I am saving a great deal of time. I can call on three prospects on ranches and in small towns and get the real facts as to their proposed purchase of a new car while I would be driving a new car one

[*Continued on page 82*]

Below, Floyd Barlow, Hudson-Essex distributor, who finds selling by plane distinctly advantageous.

AVIATION DEVELOPING SEASONAL TRENDS

by
B. C. Forbes
and
R. W. Schabacker

Forbes sees winter recession as seasonal factor

HERE is how the situation now looks:

Although the characteristic aggressiveness of the American aviation industry continues to show itself in new record flights, opening of additional mail, passenger and commercial air routes, almost steady growth of practical pay loads for the transportation companies and good volume of business for the producers, there are nevertheless growing indications that the industry must furl sail moderately for the Winter season.

We have previously called attention to the inverse tendency in aviation activity from a seasonal standpoint. General business usually expects a Summer letdown followed by a normal recovery through the Autumn and well along into the Winter. The aviation industry has been expanding so rapidly that the development of a definite seasonal trend has not shown up very well in the past. Perhaps one of the more significant indications that the industry has been established in a firm position among important domestic industries would be the appearance of such a "seasonal trend" as is observable in practically all of our major industries.

The past couple of months have brought indications that such a seasonal trend is developing.

The logic of the "inverse" seasonal tendency is apparent. While most industries are cutting down their production schedules in the Summer it would be logical to expect continued high volume of activity for the aviation factors during the period of most favorable flying weather and greatest public demand for air transportation. Similarly, while general industry anticipates its proverbial Fall boom, it is only logical to look for some recession then in aviation activity.

It is still too early to decide whether the moderate recession in the industry, chiefly in the producing end, during the past month or two, is the first signal of a seasonal trend or the first signal of the depression which authorities have predicted this new business must go through —in the usual process of deflation and seasoning experienced by so many new industries.

It seems safe to say that at least a portion of the recession has been in the nature of such a seasonal factor. Certainly there is nothing to indicate that the basic progress of the industry will be interrupted to any great degree or that the well-organized, well-managed and well-financed concerns need be alarmed over a period of somewhat stronger competition than has yet developed.

Whatever recession has thus far appeared in the aviation industry has not been severe, according to high sources, and it seems more probable that the field will be better placed for a moderate letdown now, than if enthusiasm had been allowed to continue unbridled, carrying the industry too far into a state of overexpansion, over-financing and over-production.

There has been a considerable decline in America's general business activity during the past two months; so there seems no reason why the aviation industry should take fright at such intermediate recessions when they are perfectly normal and salutary for the business world as a whole.

The steel industry has dropped its rate of activity as much as 5 per cent of capacity in a single week and rate of operation is now below the same period of last year. The motor field has continued to cut down its production schedules, after the record summer output, and sales have dropped below 1928 for the first time in many months. The building industry is still declining, largely from a seasonal standpoint, it is true, but total contracts for this year will probably be about 10 per cent below 1928.

In the stock market, prices have vigorously reflected this moderate general recession in domestic industry. Prices of speculative favorites have melted drastically—and the aviation group has not been an exception. Declines have been most severe, as we have previously warned, in those issues which were new and unseasoned, the result of promotion schemes, or which had been bulled to exorbitant heights.

As we have likewise warned in previous articles, however, general declines in security prices are no respecter of individual issues, and the strong have come

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THE INVESTOR

With aviation stocks changing position rapidly in an industry complicated by swift growths and rapid amalgamations, the opportunities for both wise and unwise investment are large. It is only on the basis of accurate and newest information that proper judgment of value may be achieved.

In order to service those readers who are interested in investment possibilities AERONAUTICS will secure the best available information on all current investment possibilities on request. Queries should be addressed to *Aeronautics Advisory Investment Service.*

Alexander Klemin
Professor of Aerodynamics, College of Engineering, New York University

Article 14 ▲ ▲ ▲ ▲ ▲

Lateral Stability

AERODYNAMICS

THE lateral motion of an airplane is far harder to understand than its longitudinal motion, because rolling and turning are so closely interconnected, and the following simplified treatment is only approximately correct. Nevertheless it should give the student a basis on which to build his knowledge of the subject.

There Is Actually No Stability in Pure Roll

There is actually no stability in pure roll for an airplane.

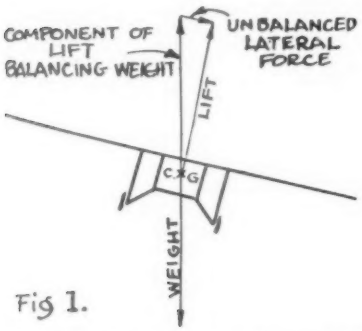


Fig 1.

An airplane rolled, but flying in the same straight line as before. The roll will not tend to right the plane because the lift force passes through the center of gravity.

Imagine an airplane which is flying horizontally, suddenly banked without any change in the horizontal motion as shown in Fig. 1, where the motion is supposed to be into the plane of the paper. The lift force will still be at right angles to the motion, and will still pass through the plane of symmetry and the center of gravity of the airplane. Therefore it exercises no restoring moment about the center of gravity of the airplane. Nor does it make any difference whether the center of pressure is above or below the center of gravity.

A Roll Always Produces Side Slip

Let us study the diagram of Fig. 1 again. Since the lift force passes through the center of gravity there is no restoring moment, but there is also no equilibrium of forces. There is an unbalanced lateral component of the lift, which must produce side slip to the right.

Fins Above the Wing, Dihedral and Sweepback

It is when the side slip occurs that a righting moment will be brought into the play, by one of three things:

(1) A preponderance of side area above the center of gravity.

(2) Dihedral in the wing.

(3) Sweepback of the wing.

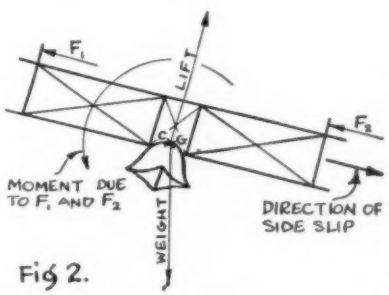


Fig 2.

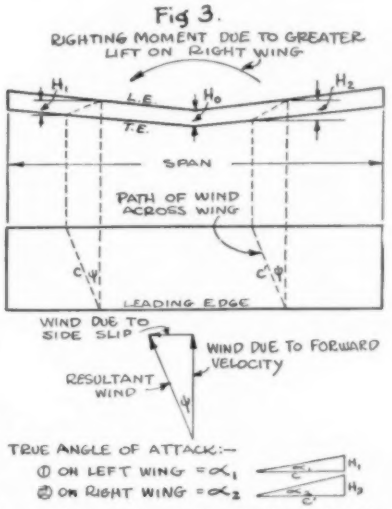
F_1 and F_2 are lateral forces on fins giving righting moments in side slip.

The best way to illustrate the first effect is to recall the old fashioned flying boats. To balance the large side area of the hull, it was customary to place large fins above the wing. After the side slip began, the side forces on these fins produced a righting moment.

Such fins have now been discarded, because they had to be quite large to be effective, and therefore introduced an appreciable drag.

Wind tunnel experiments and theory both indicate that a dihedral in the wing can give a more powerful restoring moment on a side slip with less loss in aerodynamic efficiency than the wing fins. The wing with dihedral on the side slip experiences a side force just like the fins, and if the wing is above the center of gravity, there is a restoring moment accordingly. This, however, is only a small proportion of the dihedral effect. The major effect comes from the fact that the angle of incidence on part of the wing nearer to the side slip becomes greater than the angle of incidence on the part of the wing further from the side slip. The diagram of Fig. 3 demonstrates this effect geometrically. If the wing slips to the right, the air no longer meets the wing symmetrically but on a line inclined to the axis of symmetry. If a section is taken on the right side, the effective angle of incidence is seen to be increased, while on the left side it is decreased.

Fig 3.



α_2 is greater than α_1, therefore lift on right wing is greater than lift on left wing.

Sweepback also gives a restoring moment on the side slip but a much less powerful one than the dihedral (1 degree dihedral is equivalent to 10 degrees of sweepback). The effect of sweepback in a sideslip is shown geometrically in Fig. 4.

The lift on a wing is really produced by that component of the velocity which is perpendicular to the line of symmetry of its length. On the right wing the side slip brings the resultant wing almost exactly at 90 degrees to this line of sym-

metry. On the left wing, the resultant wind is still further away from being at 90 degrees to the line of symmetry.

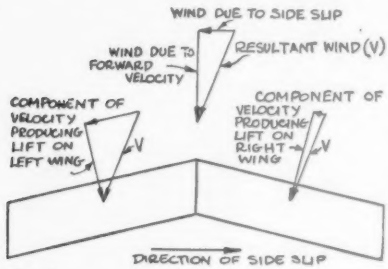

WIND DUE TO SIDE SLIP
WIND DUE TO FORWARD VELOCITY
RESULTANT WIND (V)
COMPONENT OF VELOCITY PRODUCING LIFT ON LEFT WING
COMPONENT OF VELOCITY PRODUCING LIFT ON RIGHT WING
V
V
DIRECTION OF SIDE SLIP

Fig 4.

Lift producing component of velocity is greater on right wing than on left. Plane has righting moment in the same direction as given by dihedral.

It is very difficult to calculate the dihedral angle required on a given airplane, because all parts of the machine, struts, wheels, fuselage, etc., contribute to the lateral area and the effects of these various parts are doubtful. Wind tunnel tests are the only reliable guide.

Stability in Yaw

When the airplane swings to right or left from the course, it is said to be yawing from the course.

If a side gust strikes an airplane, it should yaw into the wind like a weathercock. As soon as the airplane is pointed into the gust, the condition of flight becomes absolutely normal. If the airplane swung away from the gust, the abnormality of the flight condition would be increased and might result in a spin.

In order that an airplane may have weathercock stability, it should have a preponderance of lateral area behind the center of gravity. Fig. 5 illustrates this point. The resultant wind is composed of the wind of forward motion of the airplane and of the side gust. If there is a

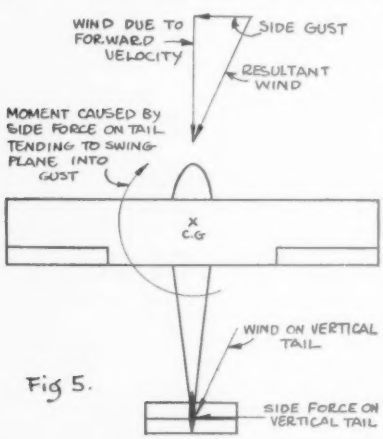

WIND DUE TO FORWARD VELOCITY
SIDE GUST
RESULTANT WIND
MOMENT CAUSED BY SIDE FORCE ON TAIL TENDING TO SWING PLANE INTO GUST
X
C.G
WIND ON VERTICAL TAIL
SIDE FORCE ON VERTICAL TAIL

Fig 5.

large vertical fin surface at the rear of the airplane, the nose of the airplane will swing to the right into the gust.

It is just as difficult to calculate the amount of vertical fin area required as it is to calculate the dihedral angle required, because again every part of the airplane contributes to the side area. A well streamlined rounded fuselage tapering to a sharp point is in itself a very unstable body from a "weathercock" point of view and larger vertical fin surfaces will be required than for a slab-sided, rectangular fuselage which has deep sides up to the rudder post (as in Fokker Airplanes for example). Again in a twin-engined airplane with a large cabin fuselage, with rectangular sides and projecting well beyond the wings, the forward side area of the fuselage must be balanced by a larger vertical fin area!

Side Slip, Yaw and Side Gusts Equivalent in Their Effects

If a plane side slips to the right, the wind strikes it from the right.

If a machine yaws its nose to the left and continues in its straight line motion, the wind again strikes it from the right.

If a gust coming from the right strikes the plane, the effect is that of the two previous cases.

Side slip, yawing from the course and side gusts may be said to be aerodynamically equivalent therefore. Their effects on the motion are the same and they have to be met by the same aerodynamic stabilizing devices.

Damping of Roll and Autorotation

We have seen that a wing in simple roll, without side slip, produces no restoring moment. At the same time rolling motion is opposed by the wing. This is illustrated in Fig. 6. That half of the wing which is going down receives the wind due to rolling motion from below and therefore its angle of incidence is increased, and its lift is likewise increased. That half of the wing which is going up receives the wind due to rolling motion from above and therefore its angle of incidence is decreased and its lift is likewise decreased. The increase in lift on one part of the wing and decrease on the other creates a couple which impedes the roll.

There exists damping of the rolling motion only below the stall however. At the stall that part of the wing for which the angle of incidence is increasing is having its lift decreased, and the rising part of the wing, conversely, is having its lift increased. Therefore beyond the stall, a wing set in rolling motion will continue to roll, undamped. This phenomenon, known as "autorotation," constitutes a serious danger as it leads to the spin.

What Is Required for Perfect Lateral Stability

For perfect lateral stability we require
1. Ample dihedral effect, so that for a side slip to the right, the right wing tip tends to rise.
2. Ample weathercock effect so that a machine always turns into a side gust.

And also

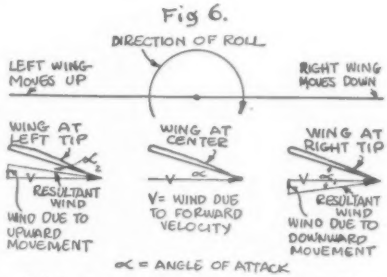
3. A certain ratio between the power of these two effects.

We do not propose to go into an intricate mathematical presentation of the subject, but the student may find it interesting to follow through a few possible cases of lateral motions (during which the pilot is not supposed to intervene):

Example 1. An airplane with no dihedral in the wing and very large vertical tail surfaces is struck by a gust of wind coming from the right. What sort of motion is likely to follow if the pilot does not intervene?

Owing to the large vertical tail surfaces, the plane will turn rather sharply into the wind. While it is turning, the left wing tip will be moving more rapidly than the right tip, and will accordingly

Fig 6.



Lift is greater on right wing due to greater angle of attack on right wing. Therefore, a couple is produced which resists the roll.

tend to rise and the wing will bank. The bank will cause a side slip to the right. The side slip to the right is equivalent to a gust from the right, therefore the powerful vertical tail surfaces will nose the machine still more to the right. Owing to the natural banking moment, the bank will now be accentuated, followed by more side slip and tighter turning. When the bank has become fairly steep, the vertical tail surfaces will be turning the machine about the horizontal as well as the vertical axis. Finally a tight spiral nose dive will result.

Example 2. A machine with large dihedral in the wing, and small vertical tail surfaces is struck by a gust of wind coming from the right. What sort of motion is likely to follow if the pilot does not intervene?

The gust from the right is the equivalent of a side slip to the right. The vertical tail surfaces will turn the nose of the plane to the right. At the same time the large dihedral and the wind from the right will raise the right wing tip rather sharply. The plane will thereafter side slip to the left, start turning its nose to the left, and owing to the large

[*Continued on page 97*]

AERIAL NAVIGATION

RADIO AIDS TO SKY PILOTAGE

by
Cdr. Douglas G. Jeffrey, R. N.

"It is in the realm of navigation, whether in the air or on the sea, that Wireless Direction Finding has its great application for the benefit of mankind in general."

L. D. LYMAN (the aviation expert of the New York Times) in a recent article describing the operation of the Transcontinental Air Transport's 48-hour service between the Atlantic and Pacific comments on the fact that both the chief and assistant pilot of the plane in which he travelled were accomplished radio operators. This is, I believe, a standard requirement of the T.A.T. for their pilots, and in this they are ahead of the Department of Commerce, who have not, so far, made radio proficiency a requirement for a Transport Pilot's License.

The author, who as a sailor, has experienced the difficulties and anxieties of "low visibility" navigation before the days of radio aids, and who has crept carefully "up Channel" unable to see the length of his own ship and surrounded by shipping equally blind, all depending on fog horns and sirens for safety, has acquired a very keen appreciation of the value of Direction Finding that "works" regardless of visibility and not only determines the position of the ship with regard to the land but also the relative position of unpleasant neighbours.

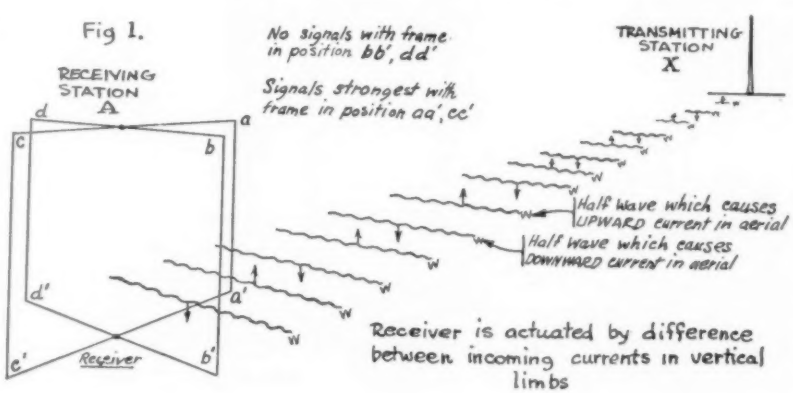
In the summer of 1905, one of His Majesty's Cruisers left Plymouth bound west, on a trip round Land's End to test the then new Marconi Direction Finder. On May 30, 1916, the reports received from the numerous D.F. stations that had been established around the British coast indicated that the High Seas Fleet was at last "on the move" and Jutland was the result. So accurate was the work of these stations that it seems that the Admiralty had more precise information regarding the position of the German Fleet during the dark hours of May 31 and June 1 than had the British C. in C. Someone, however, blundered and this information was not passed to the Grand Fleet as speedily as it should have been and daylight on June 1 found von Scheer steaming hotfoot into Wilhemshaven and Jellicoe still keeping watch and ward of Horns Reef.

Radio aids to navigation may be roughly divided into two main heads, Direction Finding and Directive Transmission. At present the former is of greater importance to the navigator although the latter is intimately associated with its younger brother (Hertz having experimented with directive radiation some twenty years before the advent of practical wireless telegraphy).

The early type of D.F. apparatus used by Marconi and the Royal Navy was a cumbersome aerial or rather "circle of aerials like the spokes of a wheel, free at the circumference, but with the down leads coming together at the hub." By means of a switch the receiver was switched from one aerial to another and the aerial, in which the signals from the transmitting station were found to be strongest, was found to be pointing away from the ship. A direct application of the above principle is the Telefunken Radio Compass which will be described later on.

Efficient Direction Finding requires the careful observation of minute changes in currents flowing in the various aerials and receiving circuits and, because of this fact, did not make great progress until the advent of the thermionic valve (popularly known to radio fans as a tube or amplifier) which enables these minute changes to be magnified many thousand times and thus rendered capable of accurate measurement. Figure No. 1 demonstrates the general principle of the direction finder. The transmitting station "X" is sending out waves "w." "A" represents a frame aerial (two frames of wires at right angles to each other). In

Fig 1.



the frame the edge a a' is end on to the direction of the waves and the current is induced first in a a' and then in c c' as the waves pass forward. The resultant is the difference between the two currents and will operate the receiver of the listener in.

The second frame c c' and d d' which is broadside on to the advancing waves makes contact on its two wires at the same instant, producing equal opposing currents that neutralise each other and the receiver registers—nothing. Here we have a very simple method of determining the direction of a sending station. Connect the detector and a telephone receiver to the frame and when it is rotated to a position that gives the maximum signal, then the edge of the frame must be pointing towards the sending station. By taking two or three bearings of known stations all the angle and bearing problems described in the second article of this series can be made use of. Fig. No. 2 shows an example of this method it being assumed in this case that the ship or plane is fitted with D.F. Apparatus.

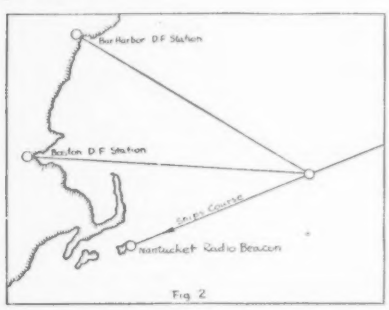


Fig. 2

In the early days of ship installations (D.F.) the masts, funnels, and other masses of iron presented difficult problems. One by one these difficulties were solved in the ships and the same process is now going on in planes, where, however, most of the ship problems have been magnified and aggravated one hundred fold. The shore stations in marine practice and the ground stations in aerial navigation perform exactly the same service and we will consider the ground stations first and the aircraft installations later. The very simple form of Direction Finder described above although it demonstrates the principle underlying all D. F. operations was found (except in cases where a small aerial with approximate results would suffice) to be impracticable owing to the difficulty in moving large frame aerials with sufficient speed, speed being essential to directional bearings and a large frame being necessary in order to give the aerial the requisite amount of "collecting" capacity.

In 1907 two Italian inventors, Bellini and Tosi, came to the rescue and their system with slight modifications is the pattern for all modern D. F. installations.

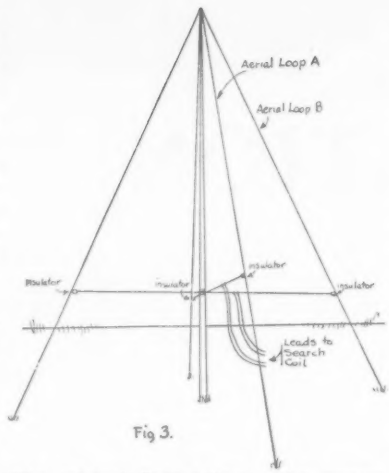
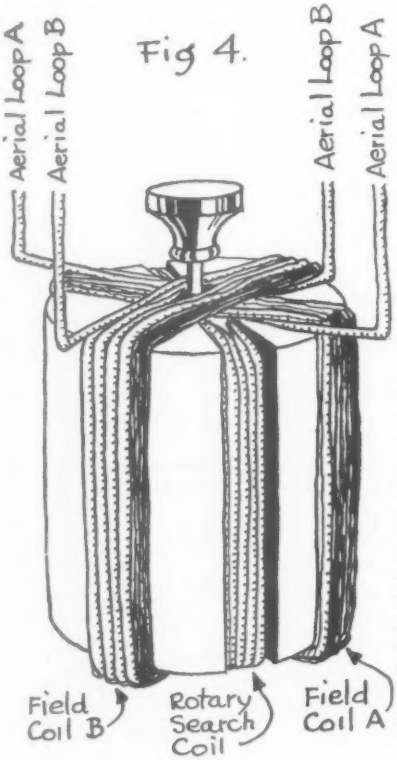


Fig 3.

The original Bellini-Tosi aerial system comprised four independent angular fixed aerials, erected with their planes at right angles to each other, the four upper ends of these aerials being inclined towards and supported by a central mast (Fig. No. 3). Mr. C. E. Prince of the Marconi Company modified this (1912) by converting the four open aerials into two closed loops (Fig. No. 4). The two ends of the loops were connected to a small search coil of handy size. This search coil being in reality a frame aerial, fed by the influence of two master fixed aerials. The rotation of the coil is the equivalent of the rotation of a large aerial with added advantages in weight and speed.



The ground D. F. station, in addition to the radio compass, is equipped with a specially calibrated chart (very similar to the Mooring Board of the Royal Navy and the Maneuvering Board of U.S.N.) marked off in 360 degrees in the same way as the dial of the D. F. instrument. The position of the station is made the center of this circular scale. When a ship or plane calls for a report the operator turns the pointer and with it the coil (or frame) until the signals are inaudible or reach a minimum intensity, he then reads the dial face, notes the reading and transfers it to the chart and transmits the corresponding bearing or line of position to the craft concerned. This method gives a line of position only. To get a "fix," two or more stations are necessary. Land stations are frequently connected by direct phone or telegraph for this purpose and then act as a unit under the control of a master station, that answers all calls and directs operations generally. New York has a group of four radio compass stations and three radio beacons.

The radio beacon differs from the D. F. station in that its services can only be utilized by craft carrying their own D. F. installations whereas the D. F. station is available to any vessels carrying an ordinary commercial W/T set. The beacons have distinctive Morse code signals corresponding to the flashes and eclipses of the ordinary marine lighthouse. For instance Sea Girt Radio Beacon sends out groups of three dashes for a period of sixty seconds followed by six seconds silence; Diamond Shoal Light Vessel sends out groups of two dashes for thirty seconds followed by thirty seconds silence, and so on. The work of the D. F. stations has multiplied rapidly in recent years but the increase in the number of ship installations and the establishment of further beacons should tend to relieve the pressure and enable these stations to devote more time to the demands of aircraft which are increasing day by day. To give some idea of the work of D. F. stations, it is interesting to note that in a twelve month period of the D. F. stations of the U. S. A. give positions to approximately 60,000 ships, this work involving the taking of something like 150,000 bearings.

A further modification of the beacon is the Scheller Course Indicator which was specially designed to enable aircraft to keep their course. "The general arrangement is two horizontal aerials inclined to one another at an angle, so that they have different direction maxima. If Morse signals are sent out continuously from both aerials, a plane travelling towards them will pick up signals of equal strength when in a position midway between the aerials. Should

[*Continued on page 66*]

THEY TELL US—

A Forum of Comment Criticism and Remarks

San Diego, Calif., Oct. 15.—In regard to the matter of placing air transport companies under the jurisdiction of the Interstate Commerce Commission we agree with you that the time is not ripe for such jurisdiction.

Some months ago a Bill was introduced in the California State Legislature proposing to place California transport companies under the State Railroad Commission. This Bill was vigorously opposed and was defeated. It was the opinion of the Aircraft Legislation Committee of the State Chamber of Commerce that conditions do not warrant such action at this time.

THOMAS F. BOMAR, AVIATION MANAGER
—SAN DIEGO CHAMBER OF COMMERCE

Scranton, Penn., Sept. 24.—Received your letter of the 20th with attached advanced copy of editorial to appear in October number of AERONAUTICS entitled "From the Publisher's Quill."

Your editorial has covered the subject thoroughly and you certainly have not been any too strong in emphasizing your protest against legislation which would restrict air rights of way to those first filing claims. Supervision and restrictions should be placed upon landing fields and types of carriers used to protect the traveling public, but travel through the air from point to point should never be restricted except against unnecessary hazards.

PAUL W. GARDNER, SECRETARY
—GENERAL AIRMOTORS COMPANY

Kansas City, Missouri, Sept. 18.—I can readily understand that the manufacturers following aggressive sales policies should desire to encourage competition in transportation lines in order to make sales of equipment, but I have always felt that this is short-sighted policy, and as a manufacturer engaged in the production of airplanes on a small basis, with ambitions to grow, I will admit I do not concur in such theories.

I am interested in the stabilization of the aviation industry, and I believe we must have successful operating transport companies if we are to obtain such a goal. In my judgment the manufacturers of airplanes will be better off in the long run by the enactment of policies protecting the public's money in all aviation enterprises and the stabilization of the business to the extent where public confidence will be fully obtained and justified.

A. HARDGRAVE, PRESIDENT
—CITY ICE COMPANY OF KANSAS CITY

Norfolk, Va., Sept. 16.—I have been watching for another story on aviation flight training, and expected to find one in your September issue, but was disappointed and also, there was no announcement for October. I should like to continue this serial, for it is a *true* characterization of life in Pensacola.

Two years ago I was in Pensacola, Florida, going through the same routine described in the articles, and it is with great interest that I read of the present training classes. While in Squantum this summer, I just ran across your magazine, being introduced to it by the executive officer of that station, Lieut. Joe Lynch, who had only the second article of the series. We were off to secure the first installment at a local book-store, and since then I have been watching for further stories in the series.

More stories by the same chap are greatly sought by myself and, I feel sure, all the boys who have gone through the training classes and won their Naval Aviator's designation at Pensacola, Florida.

ENSIGN CLARENCE C. WARE
—U. S. S. WRIGHT FLAGSHIP

Bromley, Kent, England, Oct. 10—Some while ago I happened to pick up the July number of your magazine in a London bookstall and I have found it very interesting.

In this number you have an article by General William Mitchell, and I should like to comment on several points discussed by him. He very rightly points out that Great Britain would be very severely hit if the Suez Canal were blocked; which could easily be done, but I think that his statement that we would be crippled, owing to lack of food supplies, is rather wide of the mark. Admittedly we have less than two months' food supplies, but we get our wheat from U. S. A. and Canada, dairy produce from New Zealand, Canada and Denmark, and meat from Argentine, U. S. A., and Australia. None of these need come through the Suez Canal.

General Mitchell goes on to say that Britain has developed a great Air Force for this reason. May I point out that the British Air Force has only some 750 Aeroplanes, more than half of which are supposed to be in India and Irak. France, which has a much smaller area to cover has over 850 planes, I understand, nearly all of which are situated inside France. U. S. A. has an even larger Air Force as you know, being something like twice as big as ours.

The R. A. F., in Britain, has the guarding of London as its most important role. A chain of defense aerodromes between London and the sea has been built for this purpose, and equipped with what I believe you call "pursuit" planes, and we call fighters. The R. A. F. has for some time been equipped mainly with two types of fighters, Gloster "Gamecocks," fitted with Bristol Jupiter nine cylinder air cooled radial engines (supercharged) giving 450 H.P. and Armstrong Whitforths Liskins fitted with Siddeley Jaguar 14 cylinder radial air cooled supercharged engines of the same power (approximately). The Gamecock is slightly smaller and faster, but I do not know its exact speed; Liskins, however, will fly unsupercharged at 153 M.P.H. at 10,000 ft. and supercharged at 172 M.P.H. at 10,000 ft. Last year Bristol Bulldogs were adopted. These fly at 167 M.P.H. at 20,000 ft., and climb to 10,000 ft. in six minutes.

Londoners were rather unpleasantly surprised by the 1928 maneuvers which consisted of an attack on London by bombers. The day bombers proved substantially faster than the fighters and got through every time. The fastest day bombers have their speeds kept secret, but among those known and published is the Hawker Hart, which flies at 187 M. P. H. and climbs to 10,000 ft. in 7½ minutes. The latest fighters are claimed to be fast enough to deal with these speeds, and are still kept secret.

Personally I think London's best safety device is a network of posts in and around London, which are fitted up with listening apparatus and operated by civilians, all in touch with a central station by telephone, and the central station is in contact with the fighters, while they are in the air, by means of wireless; in this way the fighters are informed constantly of the position of the enemy even at night.

General Mitchell also states that aircraft can sink any naval craft afloat. Surely this is incorrect. I have both heard from the lips of an expert naval authority in a lecture, and read several times that the latest battleships have been built to withstand sixteen inch shells, while those sunk were old and comparatively lightly armored.

I am glad that General Mitchell states that we were going to build those large battleships, "Super-Hoods" we called them, and four were actually laid down. We have heard so many Americans who thought we swindled them that it is good to see one who supports our views.

General Mitchell seems disconsolate about your 10,000 ton cruisers but one must remember that the German "Pocket Battleship" came as a "surprise packet" to other navies, including ourselves. Our cruisers are even more lightly armed and less fast than yours, although after being tested they are said to be as fast as any afloat in rough weather; this they owe to their high free board and beautifully proportioned lines.

I believe ours are better protected than yours and have a larger cruising radius "than any other cruising vessel afloat." As regards the waste of money, General Mitchell should remember that the German boats cost nearly twice as much as a 10,000 ton cruiser (unless yours cost even much more than ours), and that whereas the cruisers are not intended so much for the line of battle as their other duties, the German boats will be the mainstay of their battle line, and easily overpowered by any battleship. Incidentally, the great

[*Continued on page 96*]

AERONAUTICS presents here the informal opinions of vital men, believing that in a rapidly changing industry, these are of great value in estimating the direction aviation will take. These are selected primarily for value in thought or opinion.

BOOKS OF THE MONTH

AERONAUTICS will be privileged to give information concerning books and publications relative to any phase of aviation on request.

MODERN Aviation Engines, by Major Victor W. Page, air corps, U. S. R. Published by The Norman W. Henley Publishing Co., New York. In two volumes: Each $5; both $9.

It is easy for one in the aeronautical industry to grow enthusiastic over these two fine books, covering as they do the wide range of aviation engines, their construction, their characteristics and their upkeep.

With fine attention to detail, and by the use of many illustrations, Major Page has taken his subject from the birth of aviation to the present time, explaining the workings of the prototypes of today's motors and their bearing on present aviation requirements. More, Major Page has given over whole chapters to the various cooling, ignition, lubrication, fueling and other systems now in use. He devotes much space to "trouble shooting."

In volume two, individual treatment is given to the present-day engines, this taking the form of maintenance, installing, repair, handling, etc. Almost every current motor is given complete treatment.

With separate chapters given over to the Diesel motor and the power plants of lighter-than-air craft, those interested will find a fund of theoretical information here that should easily be converted into practical use.

This splendid manual will make a worthwhile addition to every aeronautical business and technical library.

AIRPLANE Welding, by J. B. Johnson, M. E. Published by the Goodheart-Willcox Co., Chicago. Priced at $3.50.

With welding coming to the front in the manufacture of all-metal and part-metal planes, this book is a timely arrival. Various kinds of welding, both gas and electrical, are described, together with equipment necessary for the handling of regular airplane welding work.

The author has kept in mind the countless peculiarities of airplane construction in his book, making it a ready reference volume for both students and mechanics.

The section of the book given over to materials for construction is especially good, as it carries through the metallurgical idea of the treatise without calling on unusual nomenclature to carry the lesson.

RHODES of the Flying Cadets, by Frederic Nelson Litten. Published by D. Appleton & Co., New York. Priced at $1.75.

With a backbone of the routine that cadets of the army air force undertake, the author has builded a story about a cadet that has to do with his adventures in the air, pursuing cattle thieves, border rustlers, etc. It is written entirely for juvenile consumption.

THE Design and Lighting of Airports, paper delivered before the 35th annual convention of the American Society for Municipal Improvements by L. A. S. Wood, manager exterior lighting section, Westinghouse Electric and Manufacturing Co. Distributed by Westinghouse.

Taking into consideration most of the problems that beset people laying out and planning airports, in respect to lighting, this paper is of value to towns who seek to get into the aeronautical swing with the building of an air field. Incidentally, the Westinghouse angle and costs are stressed.

A COURSE-SHIFT Indicator for the Double-Modulation Type Radiobeacon, by H. Diamond, radio engineer, and F. W. Dunmore, physicist, bureau of standards. Published by the Department of Commerce as Research Paper No. 77.

A complete description, uses and application of the course-shift indicator, which "is a direct-reading switchboard type instrument designed to indicate a change in the relative amounts of 65 and 85 cycle modulation in the two antennas and, in consequence, a shifting of the course," are explained in detail in the pamphlet.

SOLVING the Problem of Fog Flying. Published by the Daniel Guggenheim Fund for the Promotion of Aeronautics, Inc., New York.

The record of more than a year's experiments in solving the problem of fog hazards for air pilots is contained in the pamphlet, which extends to the exploit of Lieut. James H. Doolittle when he flew "blind" from the field, turning around, recrossing it and coming back to a short distance from the starting point.

Growth of the principle that culminated in the flight is described in the booklet.

RELATIVE Visibility of Luminous Flashes from Neon Lamps and from Incandescent Lamps with and without Red Filters, by F. Chapin Breckenridge, associate physicist, and J. E. Nolan, junior engineer, bureau of standards. Published by the Department of Commerce as Research Paper No. 78.

History of experiments in line with the use of the three types of lighting are given with a conclusion reached, "We conclude that there is no difference, sufficiently great to be found by the methods of this test, between the visibility of light from a neon lamp and light of the same color and horizontal candlepower distribution from an incandescent lamp."

A TREATISE "About the Subjective Appearance of the Horizon-Line and Earth-Surface During Flight at High Altitudes; A Contribution to the Myosensoric Function of the Eye-Muscles," by Dr. G. Schubert.

The optical illusion that the earth's surface from certain heights seems to curve upwards like a shallow bowl which he noted during his war service caused Dr. Schubert to make experiments along that line. These resulted in the book, which concludes with a summary stating that the horizon-line "rises" with the plane to 4,000 m., and from there upward is distinctly deeper.

The book is printed in two languages.

SUGGESTED City or County Aeronautics Ordinance and Uniform Field Rules for Airports. Published by Department of Commerce as Aeronautics Bulletin No. 20.

With the skyways rapidly becoming filled with craft of all descriptions and with many and diverse laws facing the flier who dares to leave his home hangar, this volume is of great value, aiding as it does the passage of sensible and uniform laws.

BRIEF NOTES FOR THE MONTH

A digest of the important information and developments of the month, compiled each issue for the busy executive with vital information classified and quickly accessible.

AIRPORTS

Establishment of a large airport in St. Petersburg, Fla., for land and seaplanes is planned by Fred V. Blair, president of Blair & Co., Inc., and organizer of Aeronautical Industrial Holding Corp. of Florida. It is proposed to have landing equipment for dirigibles.

Business men of Alamosa, Colo., recently purchased 960 acres of land, had it leveled and put in condition for a landing field. The field is one mile from the city limits. Dedication of the airport was under the auspices of the American Legion Post, Nov. 10 and 11.

The first automatic aviation runway lighting system was inaugurated at Grosse Ile Airport, 16 miles from Detroit. The system consists of lights set under lenses flush with the surface of the field, 100 feet apart, along each runway.

With 143 military, commercial and municipal landing fields and airports out of the 1,393 fields in the United States, California is leading all the States. Texas is second with 100, and Pennsylvania third with 89.

Two steel hangars, 200x250 feet, costing approximately $65,000 each, have just been completed at the "model airport" of the United Aircraft & Transport Corp. at Burbank, Los Angeles.

American cities are spending $200,000,000 this year to acquire new airports or improved existing terminals, A. K. Humphries, vice-president of Boeing Air Transport, Inc., estimates.

New York state has 49 airports in operation and several more are planned. New Jersey has 42 in operation and 29 planned, while Connecticut has 10 in operation and 16 planned.

The New York Seaplane Airport at Port Washington, L. I., was dedicated recently with Edward P. Warner, William P. MacCracken, Jr., and Enea Bossi as speakers.

Fifty planes took part in the dedication of an airport at Bethlehem, Pa., recently.

AIR MAIL

A saving of $3,000,000 in readjustment of air mail rates is planned. Although there is a $1,701,000 deficit in the operation of the system for the fiscal year, the Post Office Department will not curtail service.

There were 655,689 pounds of mail transported by air in September, as against 698,062 in August, the Post Office Department announces. There were three less business days in September.

San Juan and Paramaribo have been joined by an air mail service. All Pan-American mail is to be dispatched from Miami by airplane for points in the Windward and Leeward Islands.

Approval for the Pittsburgh-Norfolk route for air mail was announced by W. Irving Glover. The service will take in Washington, D. C.

The Post Office Department is considering a system of lines to transport air mail exclusively.

Air mail service in America covers 75,000 miles a day, according to Col. Harry H. Blee.

El Salvador has been placed on the air mail route between Brownsville and Guatemala City.

ARMY & NAVY

Lieut. Harvey H. Holland, army air corps, is planning a refueling flight from Manila, P. I., to New York City, via Tokio and Nome. He conferred with E. E. Porterfield, Jr., president of the American Eagle Aircraft Corp., relative to building a single motor plane for the flight.

More land for the air corps in the Philippine Islands is proposed in a bill which the Department of War has just asked to have introduced in the Senate and House. The measure provides for an exchange of lands of the U. S. in the Islands for lands of the Philippine government.

Lieut. Elmer L. Johnson, executive officer of the naval reserve base at Great Lakes, Ill., told 75 women, members of the National Patriotic Association, that wives and mothers of would-be aviators can do much to retard or speed the progress of aviation.

Army flight surgeons must receive 10 hours of dual flying instruction. The purpose of this new policy is to familiarize surgeons with actual conditions under which aviators fly.

Samuel D. Heron, engineer of the air material division of the air corps at Wright Field, Dayton, has been presented with the Manly Medal for achievement in aeronautical engineering for 1928.

Graduates of Army Air Corps Advance Flying School at Kelly Field, Tex., will be required to serve in the army for two years following their graduation, the War Department announces.

Lieut. Joe Loutzenheiser became a member of the Caterpillar Club over Hermosillo, Mexico. Another late member is Lieut. Thomas S. Power. He "joined" near Gloucester, Va.

Machine gun crews and machine guns were dropped from airplanes by means of parachutes during tests at the Army Air Corps primary school at Brooks Field, San Antonio, Tex.

The naval aviation expedition announces discovery of a hitherto unknown lake in Alaska. This lake is capable of 45,000 h.p. hydro-electric development.

The Army Air Corps has purchased 390 engines with a complement of spare parts from Pratt & Whitney Aircraft Co.

The Clarence H. Mackay Trophy for 1928 was presented to Lieut. Harry A. Sutton by the secretary of war.

A class of 119 was graduated at Kelly Field, Tex.

CANADA

That Canada carried more freight and passengers by air in 1928 than did the United States was the surprising news released recently in Washington. Last year, 74,689 passengers and 2,404,682 pounds of freight were carried by plane in Canada. Miners and prospectors regularly make trips by air to districts almost inaccessible by any other means of transportation. Flying clubs with close to 4,000 members are given credit for part of the total.

CHANGES

Incorporation of the Stanavo specifications board, formed by the Standard Oil Companies of New Jersey, Indiana and California, is announced. The company was organized to expedite business which may develop under its trade-mark formulas in the country and abroad. H. J. Saladin was elected president and Capts. E. E. Aldrin and S. S. Shadderton were elected vice-presidents. D. P. Barnard and Drs. B. C. Hennings and J. B. Terry are other members of the board.

Plans to create a world-wide aviation corporation have been disclosed in New York and London. According to the information made public, Dr. Claude Dor-

nier, builder of the DO-X, has joined forces with Anthony Fokker. It was announced also that the Dornier Corp. of America had been formed and papers filed in Wilmington, Del., for the new company.

John A. Love of Love, Bryan & Co. announced a merger of American, British and French aviation companies with combined assets of more than $7,000,000. The merger will be effected through interchange of shares.

Air Associates announces a subsidiary under the same name, incorporated under the laws of Delaware, formed for the purpose of taking over the Illinois business of the parent company.

Acquisition by Ex-Cell-o Aircraft and Tool Corp. of the Govro-Nelson Co. of Detroit was announced by N. A. Woodworth, president of Ex-Cell-o.

Northern Minnesota Flying Service, Virginia, Minn., has been purchased by the Great Northern Aviation Corp., St. Paul.

The Bourdon Aircraft Corp. of Hillsgrove, L. I., has been merged with the Viking Flying Boat Co. of New Haven.

DISTRIBUTORS

Aero Corp. of California has acquired the Southern California agency for Fleet airplanes. The company also distributes the Fokker and Alexander planes and the Pratt & Whitney service and parts. The company has taken over the Davis monoplane agency for its district.

The Thompson Aeronautical Corp. has been given the exclusive distributor franchise for products of the Rusco Manufacturing Co., Paul A. Wright, general sales manager of TAC, announced.

Aero Agents Co., Chicago, distributors of The Cavalier airplane in the six Great Lakes states, announce the appointment of Northern Indiana Flying Service, Goshen, as dealers.

The Ruekstell Corp., Ltd., has been appointed distributor for Great Lakes Aircraft Corp. for California, Nevada, Arizona and Utah and the Hawaiian Islands.

R. Ernest Tucker has completed organization of a sales and service organization covering the country for Kinner Airplane & Motor Corp.

Columbia Airways, Inc., of Salt Lake City, Utah, have been appointed distributors of the Davis V-3 monoplane in their territory.

The French Committee for Aeronautical Propaganda contemplates the organization of an international congress for aerial safety next year.

Waco Aircraft Co. announces the appointment of Wings Corp. of Philadelphia as distributor in that section.

Dungan Airways, Inc., of Cleveland, Ohio, have been appointed Ohio distributors for the Barling NB-3 monoplane.

United Aircraft Exports, Inc., has been appointed exclusive foreign sales agents for the Russell Parachute Co.

Weiant Aircraft Sales Co. of Newark, Ohio, have been appointed dealers for the Barling NB-3.

H. M. Gunderman, Goshen, Ind., has taken the dealership of Cavalier airplanes.

FOREIGN

The Société Anonyme Belgique d'Exploitation de la Navigation Aerienne, Brussels, will fly a new service throughout the winter. Essen-Muelheim-Duesseldorf-Brussels-London is the route. The new service is expected to replace the Cologne-Brussels-London route of Imperial Airways, Ltd.

The Aspern Aerodrome, near Vienna, may be made the leading central European air station by the recent opening of two new services, an air line from Vienna to Innsbruck, Constanz, Zurich, and another from Vienna to Klagenfurt, Salzburg and Munich.

Belgium is now assisting members of flying clubs in that country in the purchase of airplanes for training purposes, the government contributing one-half the cost of the two-passenger 100 h.p. Belgian airplane. Some twenty planes have been sold to individuals for sport flying.

Since spring, air service between Belgrade and Sophia has been doublod. Passenger service is maintained by the new "Potez" machines three times a week, while merchandising service is operated with the old "Spat" planes.

A Swedish concern is manufacturing a pursuit monoplane made chiefly of duralumin steel with sheet steel fittings and fuselage covered with smooth sheet metal. The plane is low wing, with radial air-cooled engine.

Leading business men of Cuba are associated with prominent bankers of the United States as officers and directors of the Compania Nacional Cubana de Aviacion Curtis, formed to develop aviation in Cuba.

Milan, Italy, is constructing a new airport which will include a large basin permitting the arrival and departure of seaplanes. Milan is becoming one of the most important aerial centers of Italy.

Seven light airplane clubs are now in operation in India. All are equipped with light planes of the DeHaviland "Moth" type. Facilities are available for training club members to become pilots.

Union Airways, Ltd., has inaugurated an air mail service between Capetown, Port Elizabeth, Johannesburg and Durban in South Africa. The Airways obtained a contract and subsidy of about $40,000.

The India Air Service will be extended next year to bring Australia 16 days nearer London, Sir Eric Geddes, chairman of the Imperial Air Ways, announces.

France has created an air police force. The police plane will make use of black smoke signals to order delinquent pilots to follow the police plane to the ground.

A three "Mongoose" engined plane known as the "Lasconder," designed by an Australian, is now being constructed in Australia.

President Portes Gil has issued a list of international airports at which all American and other foreign planes may stop in Mexico.

Citizens of Constantinople presented the Turkish government with three airplanes recently. Tags were sold for the purpose.

The Portuguese government has asked for bids for a thirty years' exclusive concession for the transport of goods by air.

The regular Dutch East Indies Postal Air Service announces ten-day service between Amsterdam and Batavia.

Tri-Motors Safety Airways, Inc., have inaugurated the first air passenger service between Santiago and Buenos Aires.

The Airship Development Co. has acquired the Airship Shed at Cramlington Airport, Northumberland, England.

Air transportation service between Turin and Rome has been authorized. Ten hours will be saved travelers.

A daily mail and passenger service was inaugurated between Calcutta and Siliguri by the Bengal Air Transport Co.

Cols. Pablo Sidar and Roberto Fierro were the first to receive the new Mexican Aeronautical merit medal.

Germany and Poland have reached an agreement to aid aerial traffic between the two countries.

Italy now has 13 regular air lines that extend over 9,630 miles, using 58 aircraft.

Duty on aircraft and aeronautical supplies has been lifted by the Austrian government.

GLIDERS

W. H. Bowlus, president of the Bowlus Sailplane Co. and head of the technical training department of the Airtech School of Aviation, stayed aloft in a sailplane, designed by himself and built by his company, for 14 minutes and 10 seconds to break the 23-year-old glider record made by Orville Wright at Kittyhawk, N. C., in 1906.

What is believed to be the first glider club organized exclusively among pilots holding transport licenses was formed at Fairfax Airport, Kansas City, by Capt. L. E. Miller and W. C. Green. The club has 23 members.

The Gliders Club of Wichita, Kan., has purchased a glider and flights have been made at the Associated Aircraft Airport.

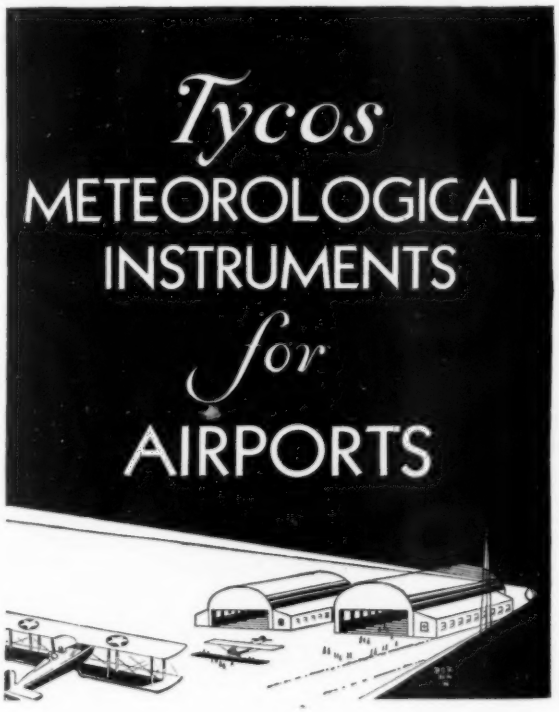
National Glider Week began on Nov. 18, which is the first anniversary of the National Glider Association.

INVENTIONS

George H. Davis, Sr., has developed "Metal Mike," which is used to steer

[*Continued on page 62*]

Meeting Government Requirements for Accurate Weather Knowledge



"ALL airports, whatever their size, should be prepared to furnish information about the weather."

This is a familiar statement to airport owners and managers, taken from the Department of Commerce bulletin "Notes on Airport Management" and part of an article saying that minimum information should include the wind velocity, temperature and barometric pressure. Records of humidity, maximum and minimum temperatures, and rainfall are given as desirable.

TYCOS Instruments for airports fulfill these requirements. Seventy-eight years experience manufacturing fine instruments has given Taylor Instrument Companies an enviable reputation for high grade products. TYCOS weather instruments are used by the U. S. Weather Bureau, U. S. Navy, U. S. Army Air Corps, and leading airports. TYCOS weather instruments are made of the finest material, built by skilled mechanics, and tested and retested to insure their accuracy.

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AMERICA TRAILS IN WORLD AERONAUTICS

[*Continued from page 16*]

"A further example was afforded by the way in which events on the southwest frontier of Mesopotamia had been dealt with. In the autumn of last year the tribes on the frontier started raiding as a result of poverty and want. I do not believe there was any political reason for those raids at all. It looked as if a serious situation might arise along a thousand miles frontier, from Trans-Jordania to Basra, upon which land forces could not have been supported even if they had been available. It was significant to note that, although the garrison of Iraq was comprised of only five air squadrons, it was unnecessary to send reinforcements from the West at all. Three squadrons were able to stabilize the situation with only a single casualty in the whole of the British Air Force. The casualties on the other side, too, were quite insignificant, showing that an air operation of that kind was far more humane than would have been an operation involving long columns of troops and lasting months and possibly years."

England is establishing commercial air routes to all her dependencies, both by airplane and airship. She also operates lines to the continent of Europe. All these lines are heavily subsidized by the government and every assistance is given them. It is a two-fold advantage, first, that it develops commercial aviation, and second, that all the equipment can be used in case of war.

8000 miles of airmail line—soon to be organized for passenger carriage. This service is operated by a French company which holds international mail contracts. The water hop now made by steamer is soon to be done by airplane.

GERMANY established a Department of the Air separate from army and navy in 1916. It was largely due to this that her aviation was so successful during the war. With relatively few airplanes and pilots, the Germans were always able to render an excellent account of themselves on every front, because they could shift their forces easily and efficiently from one place to another with the least friction.

After the war, the Treaty of Versailles prohibited the Germans from having a military air force or submarines. This treaty also provided that for five years their commercial airplanes should not contain motors of over 100 horsepower. At the expiration of that time, most of the civil German companies were combined under an organization called the Luft-Hansa, or Aeronautical Trust. Stock was taken in this company by the government of the republic, by various municipalities, by great steamship companies and banks, and even by private individuals. The funds collected and subsidies received make this organization really a Department of Aviation for the German government. At the same time, it is one of the richest and best managed organizations of the kind in existence.

The Germans established airways throughout their own country and gradually to all the countries around them. Their airdromes and landing fields are models and stand today as the best in the world. Their aircraft have been developed primarily to fly at low altitudes and carry great weights. They are nearly all made of metal or cloth and metal combined. Joint companies have been formed with the Russians for extending their commercial aviation through the Soviet Republic and to Asia.

Air transport is so popular with the German people that in the summer time, the commercial passenger air traffic is a serious competitor to the railways. How reasonable the fares are may be illustrated by the fact that thrifty German housewives fly from their own to neighboring cities in order to take advantage of lower prices and bargain sales advertised at these places.

In case of war, Germany's aviation could be put into action instantly. The great numbers of dye factories throughout the republic could be transformed in a twinkling into poison-gas plants. Overnight, German aviation could be loaded up with these gases and fly to Paris, London or other European capitals and put them out of existence in a few hours. Thus one of the greatest military surprises in history could be brought about, much greater than was the case in the last war when Germany's giant cannon appeared on the front and reduced the Belgian forts to ruins before England and France waked up.

The recent flight of the German Zeppelin airship around the world has again directed attention to the great Zeppelin Company. It is a foundation for the development of aeronautics, established by Count Zeppelin. No stock is owned by individuals in this company and all its funds are devoted to the furtherance of aeronautical work. It has subsidiary companies, the profits from which are put back into the central fund. The Zeppelin airship will soon be the best means of transportation across the seas, sure, safe and rapid. Had the Germans not been stopped from building airships by the provisions of the Treaty of Versailles after the war, they undoubtedly would have had airship lines all over the planet by this time.

FRENCH air power is now organized into a ministry of aviation with its military air force, department of civil aviation and department of experimentation and research. For many years the political power of the army and navy was so great that it prevented the combination of French air power under one general head; but the losses in money, efficiency and lives was so great that the people demanded the establishment of a ministry.

The French have the greatest military air force in the world. Two thousand airplanes stand under the colors ready to enter combat. Two thousand more are in storage, ready to be manned by reserves and to take flight within two weeks. In addition to these, there are

A SAFE PLANE *for* 10-*hour student flyers*

. . . and thrilling for those who've flown a thousand

HERE'S the SAFE light plane with Handley-Page wing slots . . . Here's the SAFE light plane with the low landing speed of 35 m. p. h. . . . Here's the SAFE light plane with an unfailing Cirrus 95 H. P. motor . . . Here's the SAFE light plane with the wide, split-axle undercarriage . . . Here's the SAFE light plane built to withstand 8 times the strain imposed in normal flight.

Pilots in 16 different countries fly the Avian for instruction, travel and sport. They herald it as the safest light plane in the world!

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It performs the dizziest of stunts with perfect control. If it is stalled, those Handley-Page wing slots stabilize the plane and guard against the spin.

It makes any fair-sized clearing its port. For it floats into an easy 3-point set-down at the unusually low landing speed of 35 m. p. h. Its wide and shock-absorbing undercarriage has no fear of even the roughest ground.

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spare parts, motors and planes sufficient to keep these 4,000 airplanes going. France relies on her air power to defend her. Her diminishing population makes it necessary for her to use as many modern instruments and devices as possible in her military establishment. During the war, her people turned out more airplanes man for man than did any other country. Not only did she equip herself and many of the smaller states with airplanes, but practically all the planes the American service used on the front and a great proportion used by the British were of French manufacture.

The French have greatly extended their commercial aviation. They not only fly all over Europe, but to other continents as well. They operate the longest continuous airway in the world, one from France to South America. Their great African empire is cut by airlines. They have a military air service in their colonies and also in Indo-China.

The one in Morocco was primarily responsible for putting down the Riff insurrection of a few years ago. The campaign was first entrusted to the army, who used aviation merely to carry supplies to outlying posts. The Riffs would wait until the attention of the French was directed elsewhere, then they would concentrate on some unsuspecting French post and destroy it. At last the commander of the French aviation told the army commander that if he would allow him to employ his aviation against the Riffs, he would soon end the campaign. He would kill all their camels and horses, lay waste their agricultural fields with chemicals and bring about their surrender with comparatively little bloodshed. He was given permission to do so and in a short time the insurrection was at an end and Abd-el-Krim surrendered and was sent into exile.

In September, 1925, a Druse force of 10,000 cavalry attempted a raid on Damascus which was checked by a French group of two-place airplanes employing small bombs and machine gun fire. The French were taken completely by surprise and had not even two hours to prepare for defense on the ground. Without the aircraft, the town of Damascus would undoubtedly have fallen into the Druses' hands.

ITALY'S air forces are organized under a separate department, with a young and energetic minister of the air in charge. Shortly after the war, Italian air power went all to pieces, but its resuscitation under the Air Ministry has been complete. Before the creation of the ministry, practically all the old war flyers left the service, but immediately a good organization was created, they returned.

Italian aircraft have to be made to act at high altitudes because the northern part of the peninsula is shut off from the rest of Europe by the high Alps. Her bombers and pursuit ships are constructed to fly over these heights and go beyond them. The air force is considered the first line of defense of the country, both over land and sea, and the progressive dictator, Mussolini, sees that it has every advantage for its development. Italy has an excellent automotive industry and her mechanics are second to none in the world. A great many airplanes are manufactured and sold to other nations. Italy maintains a few commercial air lines around the Mediterranean and her possessions in Africa.

The Italians have done a great deal with dirigible airships. Their semi-rigid craft have made longer trips both in war and peace than any other airships except the German rigid Zeppelins. Italy knows full well that dollar for dollar, she can get ten times the national defense and efficiency out of her air power than out of sea power; also, with air power she can not only defend herself against an incursion from the north, over land, but can dominate the Mediterranean in a military way.

Many Italians think that air power may again make Italy what the Roman Empire was to the ancient world. When the Roman armies scaled the walls of the Alps and seized what is now Switzerland, they used this elevated keep as the base of their armies that operated in France, Germany and Austria. It gave them a grip on the European world. If a great air force could be based in the high Alps, say some enthusiasts, the planes could glide with minimum effort over France, Germany and Austria, and who knows but that some day history may repeat itself, enacting through the air what once took place on the ground?

RUSSIA, the other great power of Europe, has a separate Air Ministry and is developing her airways clear on the Sea of Okhotsk, opposite Alaska across Asia into Peking, to Vladivostok and even to the shores of Bering Sea at Petropavolsk. In the face of her well organized air force, no army could invade European Russia. The people are being educated about aeronautics, by government agencies.

Over the White Sea, in the Arctic, airplanes ply both Summer and Winter, locating herds of seal on the ice, finding where the fish go, and reporting the whereabouts of schools of whales. In Turkestan, the airplane has taken the place of the camel as a means of transport, and regular passenger air lines run into Samarkand and the old cities where Tamerlane once held sway. These airways of course are convenient for an aeronautical invasion of British India or Persia, in case there is trouble in that quarter. We have seen recently how quickly some of the Soviet air power was sent to the Chinese border.

Russia's terrain contains no high elevations. In Summer there is a great deal of swamp and marsh, particularly in that part of Russia opposite Poland, stretching from the Black Sea to the Baltic which is impassable to ground transportation. Throughout this area there is a good organization of airdromes. The climate of Russia and Siberia somewhat resembles that of North America. It is an excellent place for the development of flying. Russia has no ports which are ice free throughout the year, as they have been kept back from them by England and Japan; so they look to air transportation as their great future medium of international transport.

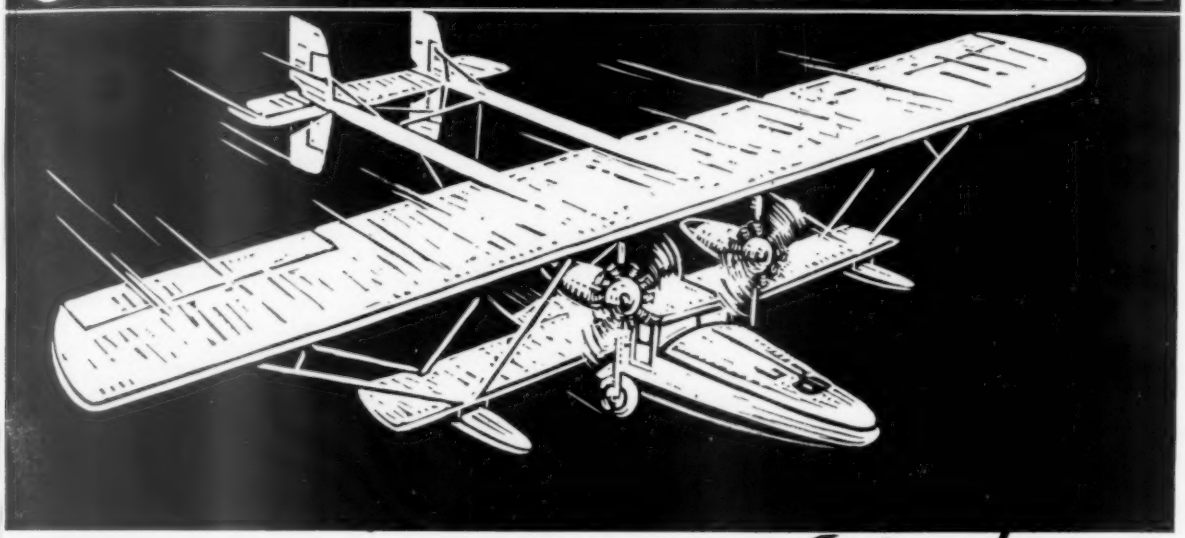
Russia has a very primitive automotive industry and is much handicapped in this respect. Unlike England, Germany, France or Italy, they cannot call on civil industry to build their engines and aircraft, but have to obtain the assistance of foreign engineers to develop their manufacturing establishments. The Germans predominate in this field, several of their companies having big aircraft factories in Russia. When I flew into Moscow not long ago, the Junkers Company had a tremendous factory just outside the city. It is true Russia makes some of her own airplanes and engines, but they buy aircraft from practically every country in Europe.

SPAIN also has its Air Force, in which great interest is taken by the population. Some of the smaller countries of Europe, such as Poland and Czecho-Slovakia, have tremendous air forces compared to the size and population of their countries. These are supplied principally with French airplanes. Turkey is now organizing her air power and buying modern equipment. A few American planes have been sold them. As a rule, Europeans buy practically no American airplanes.

The Dutch have an interesting air service. They consider it the only means of keeping an enemy out of their small country in case of war. Formerly, their principal method of repulsing invaders was to cut the dykes and dams, and flood any road that the enemy might take; but now that attack will come through the air, flooding the ground will make little difference.

Some of the best aircraft in the world have been built by the Dutch, who are excellent mechanics and artisans. A great many of their airplanes are sold to foreign countries. In their East Indian empire, Java, Sumatra and Borneo, the Dutch maintain a very efficient air serv-

OVER LAND AND SEA



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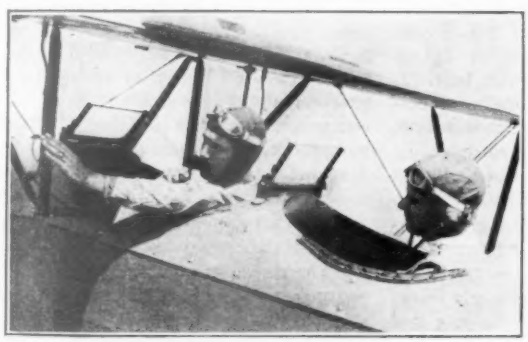

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Department of Commerce Rating Applied for.

ice which not only takes the place of an army in handling possible uprisings among the 55,000,000 subjects, but conducts such projects as mail service, surveying expeditions and aeronautical ambulances.

The Siamese have an independent air service and an excellent one for their small country. It has a military department, a department of civil aviation which reaches all parts of the state, and a department of experimentation. They make some of their own planes but most are of French manufacture. Recently they have acquired a few American planes. The Siamese make excellent pilots and they are tremendously interested in aeronautics.

In all parts of China, one finds the people interested in the development of aviation. The Chinese also make good pilots. During the recent wars, they obtained all the airplanes they could buy but as there was an agreement among the powers not to give them military aircraft, they did not do very much with them.

Japan, the great power of the Far East, has an excellent air service, modelled on the French system and organized similarly into regiments, brigades and divisions. Our experiments in sinking the battleships with air bombs, and the flight of our army airplanes round the world through Japan greatly impressed them. They know that their island empire is menaced from Asia and from across the Pacific in much the same way that England is, but they are also aware that no navy can approach them if they have a good air force as a means of defense.

The Japanese make excellent pilots. All the talk one hears about their not being able to fly is simply foolish. I have seen them flying in the worst kind of weather, holding their formations and executing evolutions as well as anybody could. They are good athletes and methodical organizers and can be depended on to have a good air force. They have organized airways throughout their own islands, north up to Kamchatka opposite Alaska, and south to opposite our Philippines, also from their country to Korea; and they will extend them through Manchuria and westward whenever they have the opportunity. They also expect to build airships of the Zeppelin type. The stop of the Zeppelin airship on its round-the-world flight recently made a profound impression on the Japanese. They have reduced their army and taken the money from this to put into aviation.

THEREFORE, to answer the question of who leads the world in aeronautics, we may say that the British lead in organization and system of handling their air power. They are looking ahead and arranging for conditions that will arise not only tomorrow but the day after that, and are ready at any time to avail themselves to the maximum of any advantages that may accrue to them either commercially or in a military way. They have a solution for every problem that faces them and they know how to handle them.

We find the French with the strongest air force in the world, the longest airways in continuous operation, and excellent technical facilities. The organization also is very good. Their principal deficiency is lack of sufficient population to furnish a great number of pilots and flying men in case of a contest with a great power.

In Germany, we find an excellent idea of organization. They would have a department of aviation if they were not prevented by provisions of the Versailles Treaty. Their commercial aviation, both heavier-than-air and lighter-than-air, is progressing very rapidly and their projects involve the extension of commercial lines all over the world. The German people are particularly interested in aeronautics. With their great population they will be able to furnish plenty of good airmen in case of an emergency.

Italy and Japan also have good organizations and are progressing rapidly with their aeronautics.

LET us see how the United States measures up to the four requisites for the development of air power. First, we have the best personnel in the world from which to select pilots. These come principally from the ranks of college men, trained to play football, baseball, tennis and polo, and skilled in horsemanship. They have the necessary education, and the idea of team play so necessary in any air work. Their reflexes work rapidly and their individuality is much further developed than that of the ordinary officer educated according to army or navy standards. Our men are brave, resourceful and able, preeminently suited to flying. Their work in the war and their flights across land and sea since then amply demonstrate this.

Coming back from Europe two years ago, one of my fellow passengers was a former commander of a French pursuit group which served under me during the war. He was one of the greatest pilots and is now one of the most successful business men of France. We were discussing the relative merits of the pilots of various nationalities who have served with us during the war.

"Your pilots," he told me, "showed themselves superior during the war. At first I thought this might be because they were fresh, not war-tired, but since the war they have demonstrated this ability again and again, in the trans-Atlantic flights for instance. Most of these flights were on the initiative of the men themselves, unaided by the government or any big company. Practically none of them turned back, they all went across or died in the attempt. Now with those from Europe, only a few crews kept on and were lost, the rest of them turned back. This may be called judgment, but in my opinion it is merely lack of 'guts'."

Second, we have the best automotive industry in the world, and all the raw materials within our own confines that are necessary for the construction of aircraft and engines. Our tremendous automobile factories can be changed with little trouble to produce good aircraft engines and even aircraft themselves, providing we have the necessary models for them to follow.

Third, our geographical position is the best in the world for repelling aeronautical attacks or pursuing an air offensive. We are self-contained territorially, we front on both the Atlantic and Pacific Oceans and have an excellent climate. The latter is an important thing because it induces the people to fly more than is the case in a country having a bad climate. Situated as we are between Europe and Asia, we have the key position of the world for the development of air power.

Fourth, we have the worst aeronautical organization in the world. Not only is it dominated by the Navy, Army, Commerce and other bureaus in Washington, which hold the whole service down and do not give proper technical assistance to our engineers and manufacturers, but the policy of the political party now in power seems to be to concentrate aeronautics in the hands of monopolies, which eventually will restrict development and greatly curtail individual initiative.

Where maximum effort is required, all the overhead should be concentrated under one direction, and the different departments or branches should operate as subsidiaries. Instead, our aviation is parcelled out among Army, Navy and Commerce Departments, National Advisory Committee and a dozen more, each of which is entirely independent of the others, and all striving for political mastery. Besides that, they are quite ignorant of the proper handling of aviation.

It is much more logical for the air force to run the navy as an auxiliary, than for the navy to run the air force. In time of war, aircraft can operate over the water without a navy, but a navy cannot do so without aircraft.

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ganization, by declaring their airplanes good or bad, but it has such a hold on the pilots of the country that it can make or break them, and is rapidly reducing them to the position of ordinary chauffeurs or truck drivers. Should a representative, for instance, of a large aeronautical company or combination in this country be appointed Secretary of Commerce for Aviation, he could wield enormous power in shifting the trade and the money making opportunities to those whom he favored.

The series of air accidents that are occurring throughout the country and the hundreds of people being killed thereby are reflections of this kind of an organization. Also, the fact that we have not one single commercial air service flying between New York and San Francisco on which passengers can travel, or from Chicago to New Orleans, or to Europe or Asia. We should have had these things long ago. The railroad-airplane routes that are advertised, in which passengers may travel at night on the train and during the day on an airplane, offer some advantages, but they possess the great disadvantage that the railroads are trying to retain this traffic for themselves and prevent aircraft from being a serious competitor. Entirely independent air lines should be developed for quick passenger traffic.

I have often wondered, knowing the tremendous efficiency of American industry, why our Army, Navy and other government departments are so incompetent in time of peace, lacking in breadth of view and in knowledge, not only of domestic, but of world affairs. I am inclined to believe it is due to two major reasons:

First, the officer personnel of these services come from the Military Academy at West Point or the Naval Academy at Annapolis, where they are cloistered for four years, completely withdrawn from the competitive spirit that rules in the business world. They are taught a great deal about the wars and campaigns of the past, how the Revolutionary War was won without airplanes, as was also the Civil War, and that anyone who flew in the World War was quite foolish; that in time of peace an airplane is an extremely dangerous instrument and that it is too bad that the interest of the people makes it necessary for something to be done about it. Fortunately, some of the individuals in the service rise away above this teaching.

The other harmful condition is that no premium is put on individual ability and competence. Promotion is made entirely according to the time that a person has been in the service. If a man demonstrates ability superior to those around him and creates something new, which would require changing the system, it might make more work or result in cleaning out incompetents, so he is sent away or put some place where nothing can be done. By the time this system has worked with a man for twenty years, or up to the time he is 45 years old, his mind has usually become quite atrophied and he is incapable of doing anything except follow the Book of Regulations. If something new arises not contained in the regulations, then it is impossible for it to be done and the thing is thrown out of court. The result is that air power gets no real help from the government except the distribution of money to the political-financial groups that have to boost the present system or they will get no contracts.

The recent publicity given to the workings of the Navy lobby in Washington exemplifies how that branch of the national service has worked through its political agencies to gobble up the principal part of the appropriations for our government air services and make aviation secondary to the building of useless battleships, cruisers and the maintenance of a number of useless navy yards and shore stations.

With no definite aeronautical policy in the United States, no department of aeronautics and no continued technical development, we are tremendously handicapped when we have to compete with other nations that are excellently organized. Practically nothing is being done by our government agencies to develop better flying machines, better safety devices or to push our commercial air power throughout the world. What emanates from the various aeronautical agencies of the government, principally the Department of Commerce, are instructions to flying people about what not to do—how not to fly, how not to build certain kinds of aircraft, how not to operate aircraft when there is a cloud in the sky, and so on. Practically nothing positive is said or done to show what should be done to develop better flying or new safety devices for going through fog, snow and hail, over mountains and deserts.

Our military aircraft are decidedly deficient to those of Europe or Japan. They are pitiful examples of leaving our air power in the hands of the Army and Navy. The military aircraft of the United States are constructed primarily for observing the fire of artillery of the ground army or of guns on surface ships. It is a good deal like an old woman keeping her forty-year-old son tied to the end of an apron string. What aviation must be organized to do now is to strike at objectives two or three thousand miles away, entirely independent of other services. The Army or Navy cannot fight in the air with an air force, they have to stay on the ground or the water.

Should war burst upon us quickly, we probably would have to buy suitable military aircraft from foreigners as we did during the last war. We ought to have commercial aircraft now capable of flying from New York to San Francisco in one hop, or to Europe or Asia.

In spite of these handicaps, the spirit of the American people, their resourcefulness, ability and the love of adventure inherited from our forefathers who left the old for this new country, are pushing us ahead in spite of the politicians and the inefficiency in Washington. Gradually our people will realize the necessity for properly organizing our air power which, when it is done, will insure world leadership to the United States.

WOMEN AND AVIATION

[*Continued from page 34*]

defiant determination. Those of the ladies who learned to fly during their flapper days have long since changed their outlooks on life. You know, an awful lot can be learned from one crack-up. And even a near crack-up will age you mentally quite a bit.

Perhaps I had better define the "Little Lucy, or Timid Type," more sharply. She is one of those funny little affected persons who seems to fear that her gender will be mistaken. She goes in for lots of fluff, lace and ribbons, and scampers about like a cute little mouse, with her voice pitched high in the upper register. Oh, how she squeals, coos and giggles! She is so bashful—always blushing—and is constantly in an abashed state. Everything she does, says or thinks is apologized for with the beseechment not to think her a bold person.

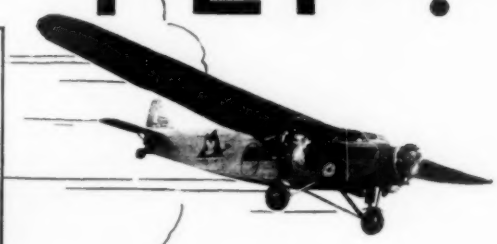
Needless to say, she does not click in flying.

Right after the first several lessons she realizes that it is not within her range of ability to learn to absorb flight training. She doesn't grasp the rudimentary ground training, of course. Then, the simple manipulation of the controls is far too audacious for her meek little spirit. The reason given for withdrawal from school is the old chestnut about failing health. The Little Lucy type is quite distressing to her instructor, and it is absolutely no fun to deal with her.

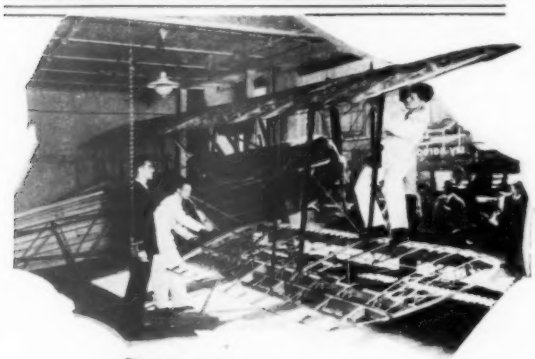
Likewise it is positively no fun to have the Talkative Woman as a stu-

[*Continued on page 86*]

WANT TO FLY ?



come to sky harbor



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For full particulars apply to RAY COOPER, Manager AIRCRAFT BUREAU, Detroit Board of Commerce

VAGABONDING BY AIR

[*Continued from page 23*]

weeks' big game hunting, ten months' wanderings and an operation for appendicitis which I had to undergo in Persia!

One could have managed on far less, but after the strain and excitement of flying, one hardly feels like economizing!

It took us nearly six months to complete preparations. Trunks containing shooting kit and general supplies were to meet us in Saigon on the Pacific coast. Permission to fly over the various countries en route had been granted, passports viséed, maps marked out, and on September 14, 1928, we left.

My wife took it all gaily, partly from natural high spirits and partly, I can't help thinking, through ignorance. Never for one moment were we sorry to have undertaken the adventure, although there were to be some moments of hardship, of danger and some of mortal terror. But there was the excitement, the novelty and the million and one amusing incidents that more than compensated.

Amazing hospitality greeted us everywhere, whether in French, Italian, British or American territory. Wanderers of the air belong to all countries and we found a certain esprit de corps or camaraderie that swept aside any questions of nationality.

As a matter of fact, somewhere en route my passport got lost, but as we were rarely asked to show our identity papers, I did not bother to get another. It was only before taking ship for Seattle that I suddenly realized that not being an American a visa was necessary!

There were, of course, delays—some enjoyable, some unpleasant—but all interesting, and our big game shooting expedition, originally intended to last over a period of several months, shrank accordingly.

I managed to develop an appendix in Persia of all places, and had to be operated upon. Luckily for me, there happened to be a clever young Irish surgeon in Teheran at that time, and he made a very good job of it. The only hospital there was run by American missionaries, entirely for natives. They gave me a tiny room to myself, and produced one nurse (all there was to be had), an Armenian, who did night duty, and my wife looked after me by day. But all this did not alter our plans, and we were on the move again within three weeks.

A far more serious thing was piston trouble in Bagdad. Individual traveling by air was still a rare enough occurrence to make it difficult to obtain a "spare part," and, accordingly, we had to wire to England to have one sent out. That took a longish time, and finally, in desperation, we telegraphed for a second one to be sent via a different route. The first piston, I don't think, ever did arrive, nor did some extra clothes that my wife had ordered! There is a legendary tale that once an elephant got lost in the post, and after our experiences, I can almost credit it.

However, in time the machine was reassembled and we were on our way once more.

Whatever engine troubles we had at first were really due to our own fault, having started out with a brand new machine. Ours was the second "Gypsy" of the series, the third having belonged to Macdonald, who so bravely and tragically attempted crossing the Atlantic in a light aeroplane.

Besides the fact that the engine itself was new, we had left the day after its delivery. I was afraid of delay, thinking bad weather might overtake us on the Mediterranean, and so we started!

But after one or two tiresome experiences with "spare parts" we thought best to have a whole new engine sent out to India on the off chance of needing to replace ours or even only parts of it.

How thankful we were to have taken this precautionary measure. One day when flying over enemy Arab country, two cylinders went in the air and I had to make a forced landing in the desert. Realizing that we were in danger where we were, I managed to taxi her slowly over the flat country, on and on. In this ridiculous fashion we must have covered thirty-five miles at least. It took us more than three and a half hours until darkness forbade further advance. An armored car finally came to our rescue late at night.

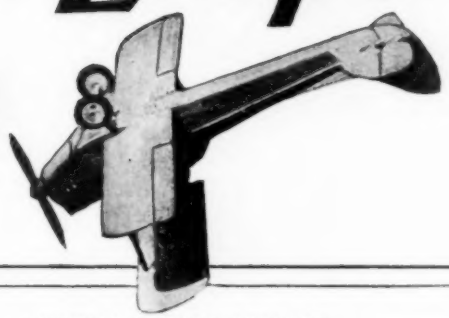
That, of course, meant another delay, but we remembered reassuringly that our new engine was on the way out. Strangely enough, experiences like these leave the greatest mark upon one's memory.

The second "Gypsy" proved an enormous success. They had had time to find out all the flaws of the earlier model and to perfect the mechanism of the later ones.

From Karachi, on the West coast of India, on to New York, we had not the slightest engine trouble, with the exception, perhaps, of one or two slight air locks which were easily remedied (and since then eradicated from the newer types of engines), although happening at the time at very awkward moments.

The intense heat, as we continued our journey, we found more than trying. Our plane would sink like a stone when landing, and the take off was equally difficult. I had to throttle her well down too. Sometimes we did not average more than 65 miles per hour. Very early morning or advanced afternoon provided the best flying hours.

6 Outside Loops in Standard MOTHS



Lt. Garland P. Peed, Jr.
Curtiss Flying Service Pilot, with standard GIPSY MOTH *plane in which he made several outside loops*

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Since I have been in Louisville, I have made two more inverted loops, making a total of five altogether, all in strictly stock model MOTHS. Three were made with a dive from normal flight and the stick pushed steadily forward until back to normal flight again, the other two with a dive to gain speed, and a half roll to inverted flight, and an inverted climb to normal flight, finishing with a short dive to inverted flight again. In addition I have made the complete series of inverted acrobatics, including the inverted spin and roll.

I believe this to be the first strictly commercial airplane in every respect to complete this maneuver. The other airplanes are, whenever attempting this, equipped with special two plane carburetors, I believe, and could hardly be classed as strictly standard. The MOTHS in every case had no special equipment, and the motors stopped as soon as the ship was inverted. After that it was a case of exceptional strength and great maneuverabilty. In every case these acrobatics were made before a number of competent observers, and can very easily be certified.

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Once we overdid the lateness in our departure. There were about 150 miles to be done, for which we allowed two hours with an extra 30 minutes for daylight. But a terrific head wind sprang up and we seemed to battle an endless course. Our speed was cut in half. (In the tropics, night comes quickly, reminding one vaguely of a stage setting, a quarter of an hour for twilight and then darkness descends.) I began to be anxious about reaching our destination in time. Only paddy or rice fields with their small dividing ridges offered possible landing grounds. I could see my wife in the front cockpit, peering round at the setting sun with a questioning expression on her face.

Finally the lights of Gaya came into view, for it was already lighting up time. As we approached I looked for the aerodrome, but there was nothing even to suggest its existence. "Can you see it?" I shouted through the speaking tube. My wife took off her smoked glasses and studied the landscape. "No," she replied, "perhaps it is the other side of the river."

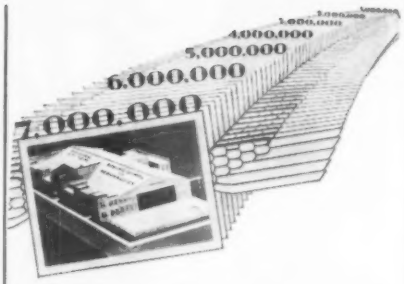
All this time it was getting darker. After one wide, unfruitful circle, I didn't dare risk it any longer; "No time to lose," I called through, "I'll try to land on that sand bank." I had no idea what sort of soil the sandy river bed provided. It was too late even to make a preliminary examination, so, throttling down, I side slipped to within a few feet of the ground and then flattened out—a trifle high on purpose—in case of a very soft surface. She came to a standstill in perhaps ten yards. And then night was upon us. But not before the native population had seen us. They swarmed from all directions.

My wife started laughing at their curiosity, but as their numbers increased, I began to be worried. Not that they were unfriendly, but when two or three hundred human beings are fighting and pushing to obtain a glimpse of an object the object usually suffers. There arose a tower of Babel. "You guard your side," I shouted, "this is no laughing matter." And then we began a march back and forth. As time went on the crowd increased, but still no white man appeared. "I'll stay here and mind the machine," ventured my wife, "while you go for help."

Suddenly a man, more intelligent than the others, fought his way up to us. "Memsahib come with me—we go get white officer." There seemed no alternative and, rather apprehensively, I watched my wife go off into the Indian night with this unknown native.

However, everything was all right, and we continued our journey shortly.

More of these lively little descriptions have been promised by Vicomte de Sibour during the coming twelve months.



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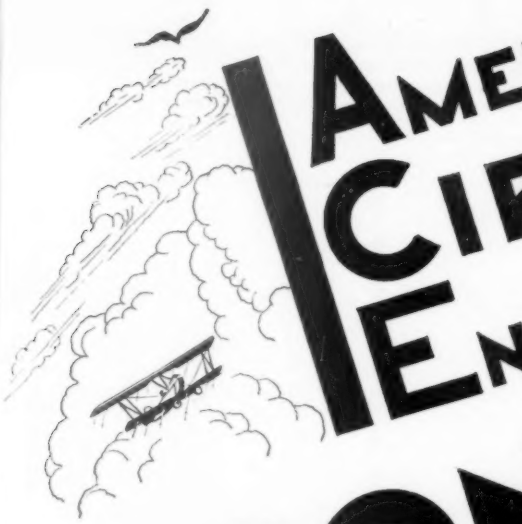
ECONOMY



Many a person would buy and operate a light plane if they did not think the expense of running it were too great. This same person operates a car and does not feel that six to ten cents a mile is exorbitant for its upkeep. ¶The American Cirrus Engine costs much less than this to run. ¶In evidence of this fact, Tex Rankin flew from Vancouver to Mexico in one day. The distance flown was 1300 miles—the time taken was nearly 14 flying hours and the expense was $22.50. ¶This is economy.

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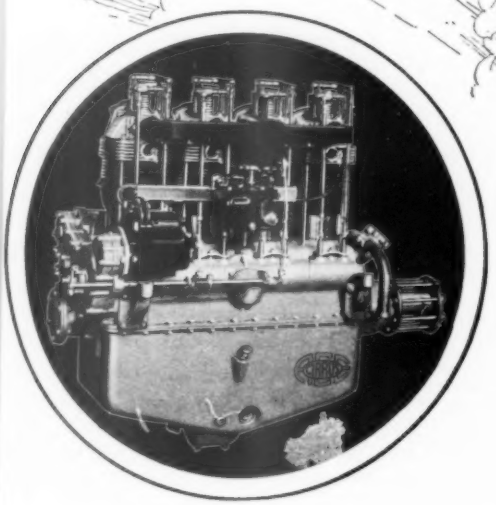
MARYSVILLE, MICHIGAN



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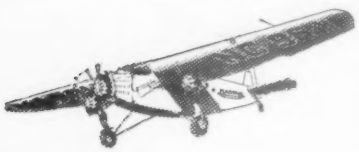
AIR LINES



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BUYERS' GUIDE

This group of indexed small advertisements will give an up-to-the minute summary of services and products available.

A Star [*] in the copy indicates that another advertisement by the same advertiser appears elsewhere.

[Please see index, page 98]

One inch insertion in this directory is $7.00 one time.

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THE PERFECT TAKE-OFF FOR YOUR FLYING CAREER

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A civilian school after the Army pattern: equipment, curriculum, Army-trained instructors. At Roosevelt Field, where Lindbergh, Chamberlin and Byrd hopped from. 45 minutes from Broadway. New building groups, including dormitory for resident students and swimming pool, now in progress. Students carefully selected. Well equipped for ground and flying instruction. *Write* N. J. Boots, Lt. Col., Roosevelt Aviation School, Inc., Mineola, L. I., N. Y.

Eagle Airways

HINCKLEY, ILLINOIS

Formerly Eagle Airport School of Aviation

60 Miles West of Chicago

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Learn to fly with real flyers

Fly on Stearmans Travel Air Monoplanes and Biplanes and Swallows. We offer the most complete courses for all classes of pilots, as well as Airplane, and Engine Mechanics. The Oldest School in the Middle West. *For full information write:*

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Examination and Rating by The Dept. of Commerce Applied for

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Jefferson School of Aviation

Jefferson City, Mo.

AIRTECH SCHOOL OF AVIATION
LINDBERGH FIELD, SAN DIEGO, CALIFORNIA
Send for Complete Information
Department of Commerce Approved Transport Ground & Flying School

Airplane Welders Are in Demand

Learn in the leading Airplane Welding School in America. We give a full and a complete course in Airplane Welding and Airplane Metals. The course is not completed until you have qualified to hold a position as an Airplane Welder. It is not limited to a definite number of lessons or hours.

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We guarantee results.

AERO ENGINEERING SERVICE COMPANY, INC.

704 E. Douglas, Wichita, Kans.

DIRECTORY

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Flying Instruction for Private or Limited Commercial Pilots' licenses. Preliminary instruction in Wright J6 Challengers.

●

Sales agents for Fairchild, Challenger and Stearman planes. Also for Fairchild Aerial Surveys. Used planes bought or sold on brokerage basis.

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Westchester County's only airport. Operated under Dept. of Commerce regulations. Planes to rent for short or long trips. Planes and pilots licensed.

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Westchester Airport Corp. (Barrett Airways), Armonk, N. Y. New York City office, Chanin Bldg., Tel. Caledonia 6188.

Westchester *Airport*

PARKS AIR COLLEGE

Parks Airport - - East St. Louis, Ill.

Complete courses for Pilots. Airplane and Engine Mechanic's Courses.

Rated by the Aeronautics Branch, Department of Commerce, as an Approved Transport Ground and Flying School. ★

Capt. J. O. Donaldson Pres. World War Ace

NEWARK AIR SERVICE

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One of the foremost schools of Pilot training for men and women. Ten planes, six different types of Travel Air and Curtiss planes available. Dept. of Commerce inspected bi-monthly. Write for catalog.

Charter trips anywhere in fast, comfortable planes.

Newark, New Jersey Tel. Mulberry 3554

SUPPLIES and PARTS

Your Airport in the South

Everything aeronautical...11 branches serving the entire south. Aircraft, aero supplies, airport construction, aeromotive service.

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Southern Aeromotive Service, Inc.
Division of Southern Air Transport System

LIGHT RIGHT ON **"TITE-SOD"**

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They Wear and Don't Tear.

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CHAS. A. HEATH

Chicago, Ill. Manager Seed Dept.

The TUBULAR AIR-CRAFT CORP. WIND TUNNEL

is now open for private individuals desiring to determine the worthiness of their patents or inventions dealing with Airplanes, Helicopters, Ornithopters, etc.

Actual flying models, wind tunnel and demonstration models made. For further information write

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All types, priced very low. Also magnetos and parts, engine parts, propellers, etc.

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THOSE who are contemplating the purchase of an airplane are invited to write to Aeronautics, 608 S. Dearborn St., Chicago, for comparative specifications and prices.

No recommendations will be made, but sufficient reliable information will be supplied to assist you in making a suitable selection.

PUBLICATIONS

FLUG

A journal devoted to aeronautics with official statements of the Austrian Ministry of Commerce and Traffic.

Official Organ of the Austrian Aero-technical Society, etc. Notes from all over the world! Subscribers all over the world!

ADVERTISEMENT — SUCCESS!

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AERONAUTICA

MONTHLY INTERNATIONAL ILLUSTRATED REVIEW

Medium of Flying and Aeronautical Construction of Italy

Whatever is of interest in aerial navigation, one may read in this periodical, one of the most valuable and most widely circulated of the aeronautical publications. Subscription: one year 150 lires.

Sample copy 10 lires.

AERONAUTICA, VIA GESU, No. 6
MILAN (ITALIE)

ILLUSTRIERTE

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Periodical for Furthering Air Travel in the Service of Business and International Traffic

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Appears Monthly

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Verlag Fuer Deutsches Flugwesen

Berlin-Lichterfelde, Auguststrasse 18, Germany

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(German Motor Review)

A special review of mechanical locomotion, of the technique of motor vehicles, and of connected industries.

In every number

Tables of characteristics of new types of touring cars, autobusses, trucks, tractors, aeroplanes, and automobile and aviation motors.

Published every four weeks (13 per year)
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DEUTSCHE MOTOR-ZEITSCHRIFT
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PUBLICATIONS

Whoever is interested in flying, whoever wants to fly or build a flying craft, should read

Flugsport

The oldest and the leading flying magazine of Germany

Reports quickly and definitely all events and novelties, gives construction tables, sketches and many illustrations from the world of aerial navigation. The "Flug-port" is, according to the statements of the foremost authorities the most reliable reference work in the field of aerial navigation. Sample copy free. Subscription price quarterly, delivered to your home, RM 4.50. Published every 14 days.

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PREPARE NOW!

for 1930's local and national meets. Our supplies will enable you to obtain better results and set records that will make your friends sit up and take notice. We can furnish you with experimental kits and non-flying scale-model kits, anything from a washer to a balsa bulk.

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MODEL AIRCRAFT SUPPLY HOUSE
Lawrence, New York

PHYSICAL FITNESS AND FLYING

[*Continued from page 28*]

shuffling up the pieces, the candidate is required to match them, end to end, in a long line, but placing the doubles at right angles to the continuing line. A stop watch is used to time the completion of the matching, and failure to match all pieces is checked as well as the time consumed. Our flight surgeons at Pensacola now consider that more important, even than reaction time and coordination ability, is the information to be obtained from the test as to temperamental qualities. The neurotic individual shows a rather characteristic jerky and self conscious reaction and Doctor Sutton, our neuro-psychiatrist at Pensacola, is of the opinion that with this test one can obtain help in the recognition of the introvert, extravert and neurotic individual.

If this test can help us in placing a candidate psychologically, it is a worth while one, because this part of the examination is the one which our experience has proven the most difficult. In grading candidates and accepted pilots, from the neuropsychiatric standpoint, there was the greatest objection to the use of the designations temperamental and psychological aptitude, when an unfavorable opinion was recorded, so now we make use of the designation aeronautical adaptability, which affects solely a man's fitness as a pilot. We do not resent being told we cannot sing or paint a picture, and the same is true of being told that we cannot fly.

Last summer I decided to send Doctor Sutton, one of our ablest and most experienced psychiatrists to Pensacola, to work with the regular flight surgeons in the study of the problem of temperament. Already his help has been recognized by his associates and his recommendations as to the method of determining psychological reactions give great promise. One part of his examination is that designated "self estimate." In this the candidate is questioned as to his self reliance, sense of humor, irritability, vanity, courage, egotism, and many other characteristics. Lengthened reaction time in replying to these questions is noted by the examiner, and this part of the examination seems to give a more accurate estimate than any other part of the psychological questionnaire.

There are two very important questions to ask the candidate for aviation training, and these are: (1) Whether he would like to fly for the pleasure, or sense of accomplishment it would give him (air minded), rather than from the standpoint of the advantage of increase of pay; and (2) whether there is a marked objection to his flying on the part of his family. A weeping or nagging wife, at breakfast, may explain a retardation of reaction time when an emergency arises, and a crash results a few hours later. From a research standpoint it would be instructive to have a large number of people examined and allow all to start training regardless of physical defects, but I am afraid such an experiment would not meet approval.

In England there is an opportunity to study the relation of crashes to physical or psychological defects in the pilot, provision being made to have the pilot sent to the central laboratory of medical aviation for a thorough examination by experts, but their statistics as to this relation are not available.

In this connection an analysis made by flight surgeons Poppen and Davis a few months ago at my request is interesting. The medical aviation service of the navy did not begin to function until the latter part of 1922, so that those officers who had taken up flying in the preceding four years had not been examined physically other than from the standpoint of an ordinary physical examination. Doctors Poppen and Davis examined the records of 604 aviators who were still flying in 1923, but who had been trained prior to the giving of special type of medical examination.

Of these qualified pilots 95.3% showed no defects when examined in 1923 by flight surgeons, 2.8% had recorded minor defects which were waived by the Bureau of Medicine and Surgery on the advice of the consulting flight surgeon. (Defects were never waived against the judgment of the consulting flight surgeon.) From this it will be seen that only 1.9% of these 604 pilots had defects which would disqualify them. Thus it is reasonable to assume that some of these men might have developed defects in the years subsequent to their becoming pilots. This analysis is significant in that it indicates the navy, even prior to established aviation physical examinations, had set up high standards for its pilots.

Throughout the world standards for military pilots are high. In four important European countries—France, Italy, Germany and England—as Dr. Davis* noted during his visit in the summer of 1928, the various services aim for the same general result but approach the objective in slightly different manners.

"Airdromes are frequent in the vicinity of Paris, Tours, etc.," Commander Davis commented, "and considerable activity was noted. No military plane leaves the ground without a definite mission, and most of the routine flying behind the lines of advanced military training is performed by enlisted pilots. Parades and other military maneuvers are frequent and all personnel are calm and apparently free from 'nerves.' Squadrons take the air without confusion and accomplish their missions in spite of the seeming lack of ground organization."

In France pilots are submitted to examinations whenever the senior doctor at the aviation center judges it necessary. The importance of the examinations is emphasized by the fact that the proportion of accidents caused by errors of piloting and professional errors totals about 40.

The Italian military examination, Dr. Davis found, is extensive, subordinating speed to thoroughness. Candidates are not examined, if fatigued, on the day of arrival and several days may elapse before a final assessment is made. Considerable time is consumed in equilibrium and other physiological tests.

In judging candidates the examining board not only takes into account the results of each examination but also the general average obtained in order that a whole picture may be considered.

Whereas civil flying in most countries has a decided military background, the Treaty of Versailles prohibits military aviation in Germany.

"Each plane," commented Dr. Davis, "is manned by a first pilot and a mechanic who also acts as second pilot. Each crew operates the same plane, changing their accustomed daily schedule only when the plane is diverted to another flight.

"Overhauls are frequent and inspections rigid. The Lufthansa company, which is the principal one operating in Germany, reports only two accidents in eight years. Any form of careless flying or landings result in discharge and all pilots carefully guard the high German wage.

"THE course at the Commercial Airplane Pilots' school is of four years' duration and a very limited number of students between the ages of 18 and 22 years of age are taken each year."

German flight surgeons place great reliance on the candidate's psychological makeup. His service as pilot depends on his health, especially the condition of the nervous system, organs of sense, lungs and circulation. His previous history is important, especially his duties during the war (if he be that old), *his attitude when in danger*, his interests in sport and his general bearing during boxing matches give the examiners an idea of his general dexterity or versatility, dis-

[*Continued on page 96*]

* An article from Dr. Davis, describing medical requirements in relation to flying in Europe, will appear in the next issue.

Northeaster Flying Togs

SELECT any article in this advertisement, write us your size and send a check for the purchase price. We shall send it by return mail. If, upon receipt, you are not satisfied with your purchase, we shall immediately and cheerfully refund your money.

WINDBREAKERS

No. 555—Highest grade of black horsehide, reversible, with heavy wool plaid lining, leather collar and leather cuffs. Two slash pockets and cigarette flap pocket as illustrated in our aviator's No. 600 jacket (pockets are not as above illustrated). Price, each.....$16.50

No. 750—Boys' Model. Black horsehide. Wool plaid lined reversible windbreaker. Same as No. 555, but with patch pockets, as illustrated. Price, each $10.00

No. 666—Same as No. 555, but not reversible and with ZIPPER front fastener that keeps out rain and wind. Price, each.....$20.00

No. 700—Same as No. 555, reversible, but with brown suede leather and somewhat lighter wool lining. Price, each.....$17.50

No. 701—Same as No. 700, but with grey suede leather. Price, each.....$15.00

No. 611—Brown suede leather windbreaker, unlined. Price, each.....$15.00

EXCELLENT HELMETS AT POPULAR PRICES

Model 180—Many students find it inconvenient to pay as much as $5.50 for a helmet. The model 180 is an excellent, serviceable helmet at a low price. Made of soft brown lambskin, suedine lined, snug fitting all around, neatly stitched, with adjustable chin strap, and goggle straps. Each.....$3.00

Model 181—As above, black leather..... 3.00

Model 185—Same as No. 180, but heavy, warm sheepskin lining for winter wear.....$5.00

Model 183—As above, black leather..... 5.00

WHITE, GREEN OR RED HELMETS

Model 290—Made of the softest gloveskins, silk lined. Each.....$6.00

CLOTH HELMETS

Model 273—White soft gabardine, unlined. Each $2.00

Model 260—Tan soft gabardine, unlined. Each $2.00

Model 272—Olive drab cloth gabardine, satine lined. Each.....$2.25

BECK

AVIATION JACKETS

Model 600—Illustrated above. This is a handsome, snappy looking black horsehide leather windbreaker, suitable not only for flying, but also for motorcycle and general wear. It looks different from the common ordinary windbreaker—and yet there is nothing odd about it; just stylish, good-looking. The lapel and collar, made of all leather, are roll front English cut. The cuffs are of leather and are adjustable. The slash pockets are handy, comfortable and serviceable. And then there is a little cigarette pocket with rain flap over it. The bottom is an all worsted knitting. The leather is of the finest selected horsehide fronts exclusively and will wear indefinitely without peeling. Lined with heavy wool plaid. Note the removable leather wind-flap (an exclusive feature) which goes all the way down to the waist. It can be turned aside in warm weather so it won't be noticed or felt. And if it gets cool it is put into use. It goes all the way down to the waist and absolutely keeps the wind out—even though you may be in a sitting position and travelling at high speed. Sizes 36 to 50. Price, each.....$18.00
No. 601—As above but in handsome mahogany horsehide leather. Each.....$19.00

LEATHER BREECHES

Model 335—Black horsehide breeches. Lace bottom. Fine peg shape. Perfect fitting. Two back pockets. Two slanting front pockets. Small change pocket. Strong lining, well-tailored throughout. Price.....$16.50

SINGLE-BREASTED COAT

No. 97—Not illustrated. Black horsehide, 30 in. long, wool lined. Three pockets. Not reversible. Each $12.50

Sold by all good dealers, or, if more convenient, order direct from us by mail.

AVIATORS' DOUBLE BREASTED COAT

No. 500—Made of finest black horsehide leather, 34 inches to the knees. One-piece front, one-piece back. Handsome belt. Four pockets, two deep slash pockets and two side pockets with flaps. Warm wool lining. Knitted wristlets inside leather cuffs.....$25.00
No. 445—As above, mahogany horsehide leather. 38 inches long, extending down to knees. Price $30.00

No. 446—Aviators' Double-Breasted Coat. Same as No. 445, mahogany horsehide leather, 38 in. long, but instead of pockets as pictured above we have two large slash pockets just below the belt, one on each side. Above belt on left breast we have a large slanting map pocket, and superimposed on this map pocket a neat cigarette pocket. Price.....$35.00

NORTHEASTER HELMETS

All helmets supplied in following head sizes: 6¾, 6⅞, 7, 7⅛, 7¼, 7⅜, 7½.

Model 276—Navy type, chocolate gloveskin, chamois leather lined. Each.....$5.50

Model 274—Navy type as above, but with ear puffs. Each.....$6.50

Model 275—Army type, tan gloveskin, silk lined, with ear puffs. Each.....$6.00

Model 300—Soft olive drab colored capeskin, soft leather lined. Each.....$5.50

Model 301—Soft coffee colored capeskin, soft leather lined. Each.....$5.50

Model 303—Grey suede leather shell helmet, unlined. Each.....$3.00

BECK DISTRIBUTING CORP., 66 EAST 131st ST., NEW YORK

BRIEF NOTES FOR THE MONTH [Continued from page 44]

ships, for aerial transportation. The instrument is composed of a set of levers placed upon the instrument board in the front of the cockpit. These levers are connected with the motor, which operates several sets of worm gears. These in turn set the rudder or control wings in any desired position quickly and hold them there indefinitely.

Fusion Welding Corp. announce development of Type-T metal, which is an alloy furnished in welding rods for applying wear-resistant surfaces by either the oxy-acetylene or metallic arc welding processes. It is claimed the metal possesses ductility which gives it unusual properties.

A new portable electric arc welding machine announced by the General Electric Co. is driven by a 6-cylinder gas engine and replaces a 4-cylinder engine-driven unit. Gasoline consumption is 2.4 gallons an hour for average welding duty.

The recently developed Diesel airplane motor, constructed by the Junkers Flugzeugwerke G.m.b.H., of Dessau, has been considerably improved. The "S L 1" motor develops 850 h.p. at 1,300 r.p.m. instead of its former 600/700 h.p. Junkers claims the power can be increased easily to 1,000 h.p.

A machine for treating fuselage structures against corrosion which is claimed to reduce the time of the operation from 45 minutes to 45 seconds has been designed and put in operation by P. O. Gibson, production manager of Nicholas-Beazley.

The first American-built Autogiro was pronounced satisfactory after a test flight. The plane is built by Pitcairn Aircraft, Inc. Senor Juan de LaCierva, Spanish inventor of the plane, was pilot.

The Navy Department has developed a special apparatus for calculating the amount of air passing through parachute fabric per minute. The bureau of standards aided in the work.

A device consisting of a suspended trailing hook over a simple ground apparatus has been perfected. It enables army aircraft to receive messages.

A giant magnet propelled by a tractor is being used at the El Paso municipal airport to remove particles of wire and nails from the runway.

Successful flight tests of a newly designed "turn and bank" indicator for airplanes were announced by the Consolidated Instrument Co.

Unit letters for air route signs on roofs of buildings have been invented by W. J. Roche. The letters are constructed of wood.

LEGISLATIVE

A new ruling on aircraft symbols has been announced by the aeronautics division of the Commerce Department. The letter "N," international symbol, must be painted on tail and wing of United States planes before they can be flown in foreign countries. All airplane licenses, other than those issued for experimental types and designated by the letter "X," will be issued for the letter "N." Commercial licenses will be issued with the symbol "NC" preceding the license number instead of the symbol "C" as in the past. Restricted licenses will be issued with the symbol "NR," preceding the license number instead of "R" as formerly.

Senator Fletcher urged President Hoover to order the interdepartmental board on ocean mail contracts not to hold up the contract for carrying the mails to Western Mediterranean ports until Congress could clarify the Merchant Marine Act of 1928 as proposed recently by the board.

Thomas L. Hill, president of the American Society for the Promotion of Aviation, urged President Hoover to endorse the bill pending in Congress appropriating $40,000,000 for free distribution of airplanes to civilian clubs and the creation of a separate department of aeronautics with a portfolio in the cabinet.

Regulation of interstate commerce by air carriers operating as common carriers of persons and property was asked in a bill submitted to the Senate by Mr. Walsh. Mr. Cable, author of the measure, submitted it to the House.

A bill authorizing the President to class as secret apparatus or equipment for military and naval use was introduced in the Senate by Mr. Reed. The bill was put before the House by Mr. James.

Uniform air laws for the states are being advocated by the aeronautics branch of the Department of Commerce. Several suggested forms of state laws are being offered by the department.

Regulation of interstate and foreign air commerce was urged in a Senate bill, submitted by Mr. Bratton.

Clarence M. Young is urging delay in federal regulation of air line rates.

MISCELLANEOUS

Eleven new plane types have been approved by the Department of Commerce, bringing the total to 202. Those just approved are the Metal Aircraft Flamingo, Curtiss Condor, Stetson four-place cabin monoplane, Spartan three-place open biplane, Pitcairn three-place open biplane, Moth two-place open biplane (2), Crown two-place open biplane, Parks three-place open biplane, Monocoach four-place cabin monoplane and Golden Eagle Chief two-place open monoplane. Motors named are Pratt & Whitney, Wright, Cirrus, Kinner, Axelson and Lebond.

The New York Times comments on the slight space given to the recent collision of steamships in the Pacific Ocean in which 70 lives were lost, and the space given to various airplane accidents. The Times quotes Assistant Secretary of the Navy Jahncke, who said: "The airplane is no longer a novelty; it is hardly an adventure. There is no mystery any more. The next ten years will see our skyways chartered and filled as our highways are chartered and filled today."

Appointment of supervising inspectors for the nine aircraft inspection districts in the U. S. is announced by the Department of Commerce. Inspectors and districts include W. O. Sargent, 1, George West, 2; Leo C. Wilkin, 3; H. F. Rough, 4; E. A. Cutrell, 5; R. H. Lees, Jr., 6; H. B. Pentland, 7; E. E. Mouton, 8, and W. F. Parkin, 9.

Branches of the Saunders Fly-It-Yourself System, Inc., will be established at fifty of the leading airports within the next few months. An order for 100 Arrow Sport biplanes, built by the Arrow Aircraft & Motor Corp., Havelock, Neb., was placed. Planes will be rented to licensed pilots at $15 an hour.

Russia is planning a celebration this fall of the anniversary of the first successful attempt to fly by a Russian, 200 years ago. According to the story, a blacksmith made two sets of wings, one for his arms and the other for his legs and managed to soar with them over the church of his native village in 1729.

The Chicago Daily News' $100 monthly prize was awarded Chester R. Blaies, pilot of Universal Air Lines, who brought medical help to two injured men. The prize is awarded to the pilot performing the most meritorious act in line with his duties.

A blow to the belief that many illnesses may be cured by exposure of the patient to the upper air was seen in the discovery that disease germs are carried and epidemics spread by air currents of the upper atmosphere. Experiments have just been completed at Cambridge, England.

A modernistic scheme of decoration has been embodied in the Commodore, largest seaplane thus far constructed in the United States. The Consolidated Aircraft Corp., maker, employed Frederick J. Pike, interior decorator, to do the work.

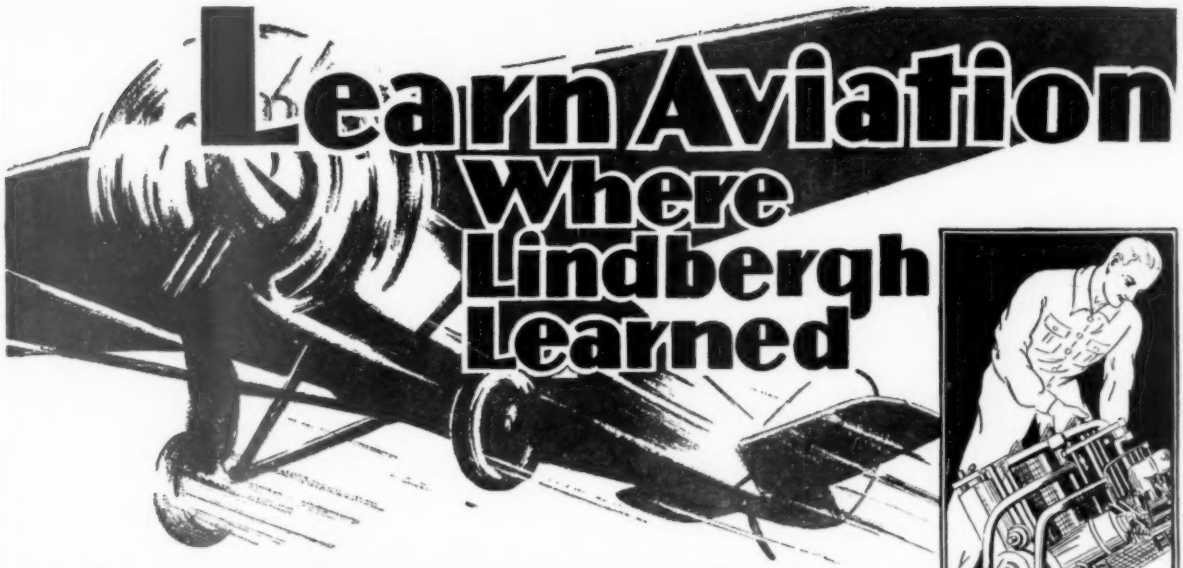
Douglas H. Davis, divisional manager at Atlanta of the Southern Air Transport, has been awarded the Barber and Baldwin Special Trophy "for the most meritorious flying at the National Air Races." Davis flew the Travel Air Mystery ship.

The aviation industry's first skyscraper will be erected at Fort Worth, Tex., to house the general offices of the Southern Air Transport System, the second largest subsidiary of the aviation corp.

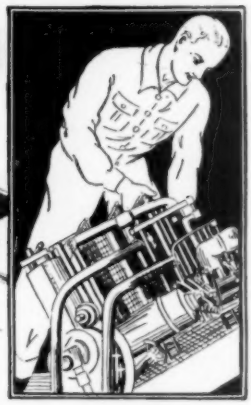
Construction of runways, landing strips, aprons, and the treatment of landing fields to eliminate dust and mud, were subjects taken up at the Eighth Annual Asphalt Paving Conference, held in West Baden, Ind.

August sales in the supply department of Universal Aviation Corp. at Lambert Field, St. Louis, increased 831 per cent over the same month last year, Hayes Walter, sales manager, reports.

Airplanes as well as ships will be classified "A-1 at Lloyds" in the near fu-



Learn Aviation Where Lindbergh Learned



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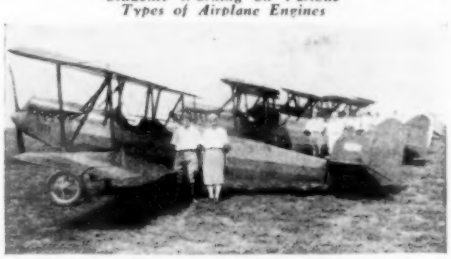

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ture. A committee of Lloyds register of shipping has completed arrangements by which certificates of aircraft will be given.

Approved type certificates for the Velie and Genet powered models of the Barling NB-3 monoplane, manufactured by Nicholas-Beazley Airplane Co., have been issued by the Department of Commerce.

Insurance against property damage by aircraft has made its debut in St. Louis. Several such policies have been sold, one for $18,000, a second for $10,000 and a third for $5,000.

A preliminary survey, which would have taken fully 12 months by a surveying party, was recently completed in four days with the use of the airplane by a Canadian electric company.

That America has surpassed Europe in commercial flying is the belief of Major Shefik Bey, head of the Turkish air mission, after completing a tour of the United States by air.

Eighty-two aviation companies offered securities to the public during the year ending Aug. 31, 1929. The total offered was $248,200,000 at offering prices.

The aviation engine of the Continental Aircraft Engine Co. recently passed its test for the approved type certificate of the Department of Commerce.

Mexico was the largest importer of American aircraft during June. Twelve airplanes were sold for $264,084. Total exports of aerial goods were $1,130,846.

The American Society for the Promotion of Aviation has created an annual medal to be presented each year to the passenger who has flown the greatest number of miles.

Climaxing a year of exceptional aviation activity in the Baltimore-Washington district, the first annual Baltimore Aircraft Show will be held in Fifth Regiment Armory, Dec. 9 to 14.

Bankers Indemnity Insurance Co. has been issued a license authorizing them to transact the business of liability aircraft insurance in Canada.

Brunner-Winkle Aircraft Corp.'s new Bird-Kinner 90 h.p. motor has received the Department of Commerce approval certificate.

More than fifty pilots took part in the first annual airfair at Sioux Falls, S. D. Over $6,000 prizes were awarded.

The Curtiss Flying Service name has been changed to Curtiss-Wright Flying Service by a vote of its directors.

The Davis V-3 Monoplane has been given approved type certificate No. 256 by the Department of Commerce.

PERSONALS

Lawrence D. Bell has been named to succeed Major R. H. Fleet as general manager of the Consolidated group of aeronautical interests. Major Fleet is retiring. Ray P. Whitman was named assistant general manager.

Ward T. Van Orman, balloonist, has been selected ad director of the ground school in Goodyear-Zeppelin Corp. Van Orman won the national race five times and the international competition twice.

W. L. Campbell has been appointed resident manager of Boeing Air Transport at Burbank. William P. Hoare, formerly eastern division superintendent, is now field manager at Cheyenne, Wyo.

Franklin C. Albright, of the Department of Commerce, has been named head of the stress analysis section of the engineering department of the Spartan Aircraft Co.

Robert Hoffman of the Chicago office of the Stout Air Lines has been promoted to the Detroit offices, where he will be in the traffic department under G. G. Jury.

Thomas Hardin has been named to direct a transportation division coordinating the activity of the various air lines, subsidiaries of the Aviation Corp.

Karl S. Betts, formerly membership secretary of the Detroit Board of Commerce, has been appointed director of publicity of the National Glider Association.

Harry F. Guggenheim has been named Ambassador to Cuba. It is expected that impetus in U. S.-Pan-American air service will be given by the appointment.

Lester D. Seymour, general manager of N. A. T., urges governmental restriction of passenger carrying lines which are not equipped with the latest safety aids.

J. A. B. Smith and Walter H. Beech have been elected vice-presidents by the board of directors of the Curtiss-Wright Corp. J. F. Prince was named treasurer.

R. K. Kalter, formerly with the material division of the air course at Wright Field, Dayton, has been appointed purchasing agent for Spartan Aircraft Co.

William F. Carey was elected president of the Curtiss Airports Corp. at a meeting of directors. Walter Marvin was elected chairman of the board.

William C. Canby has been appointed assistant to Vice-President Paul Goldsborough in charge of operations for Universal Aviation Corp.

Sumner Sewall, general traffic manager of Colonial Airways System, plans a five weeks' survey of the leading passenger air lines in Europe.

Major L. M. Means of the 138th infantry, Missouri national guard, has joined the sales organization of the American Eagle Aircraft Corp.

Major Bernard A. Law has been appointed superintendent of operations for the Corporacion Aeronautica de Transportes in Mexico.

W. G. Forstel has been appointed general traffic manager of Continental Air Services, Inc., Major M. D. Mann announces.

Col. V. E. Clark and Col. Thurman H. Bane have been added to the board of directors of the Aviation Corp.

Curtiss Flying Service has employed Louis D. Strickler, 16-year-old flyer, as a demonstration pilot.

Arthur P. Homer has been appointed director of sales promotion for the Consolidated Instrument Co.

Ralph DeVore has been named superintendent in charge of the Pontiac repair base of the TAC.

Parks Air College has appointed Harry E. Parsons director of sales in their educational department.

Capt. Kenneth B. Collings has been appointed chief pilot for the Gates Aircraft Corp.

F. L. Curtis has become publicity director for the Sikorsky Aviation Corp.

Parks Air College announces appointment of Ray W. Brown as general manager.

PRODUCTION

Purchasers of airplanes manufactured by Parks Air College, Inc., now have as wide a choice in the selection of color combinations as is possible to the purchaser of a fine automobile, Harry P. Mammen, president, announces.

The Consolidated Aircraft Corp. has received orders from the navy for 71 standard military Husky land and seaplanes, involving approximately $550,000. The planes are equipped with Wright J-5 motors.

Plans are being made by the Fokker Aircraft Corp. to erect a $300,000 unit factory at Los Angeles for the construction of the new Fokker F-32.

TRANSPORT

Aircraft Research Products Co. announce the World Wide Airways Co. to inaugurate a passenger, express and fast freight air service from Chicago to the Orient and Europe, to begin "on or about Jan. 1, 1930." The announcement says Rile Galconda dirigibles will be used. An all land route is planned.

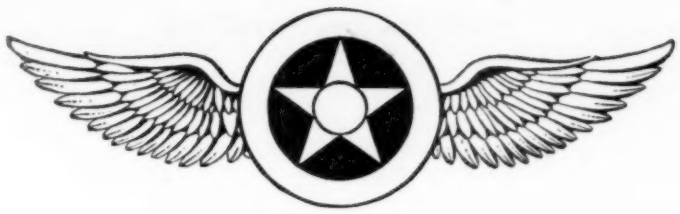
Frank H. Neely, department store executive of Atlanta, declares that with high speed air transportation, stores, such as his, are now able to carry on business with less stock than heretofore. A hand-to-mouth system of buying is becoming the rule.

The Transport Lines, subsidiary to the Aviation Corp., carried 5,150 paid passengers in September. Thomas Hardin, operations' director, points out that the figures show commercial flying is no longer seasonal.

The Thompson Aeronautical Corp. is planning an hourly passenger service between Detroit and Cleveland next summer. Eight trips may be made daily except Sunday. Light amphibian planes are proposed.

Standard Airlines, Inc., announce a coalition with the Corporacion Aeronau-

[*Continued on page 84*]



Wings Across the Nation

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The airplane has spread its wings across the nation with the speed which characterizes it as a means of transportation.

The Aeronautical Chamber of Commerce of America—national trade association of the aircraft industry—is devoted to the sound development of that industry. It seeks to solve the common problems of its members through the strength of the trade association bond.

From an organization of 100 members in 1921, it has grown to a strong body of more than 1,000 members, representing 95 per cent of the aircraft industry.

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Chambers of Commerce, flying clubs, newspapers and magazines, and dozens of similar organizations concerned with the promotion of aviation are affiliated with the Aeronautical Chamber of Commerce as Associate Members. Individuals connected with the industry or its interests are classed as Sustaining Members.

The Wings of the Chamber's emblem are seen today from Coast to Coast. It, too, has spread its wings across the nation.

The Aircraft Yearbook for 1929—an invaluable aviation reference work—is now ready. Price $5.25.

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AERIAL NAVIGATION

[*Continued from page 40*]

the plane deviate from its course, then the signal from one aerial will be almost inaudible and that from the other aerial will become louder. So long as the signals are equal the aircraft is pointing on its proper course." A visual recorder based on much the same principle has also made its appearance.

Mr. C. S. Franklin of the Marconi Company has devoted years of study to the development of directive transmission by means of a reflector, carrying on the good work of Prof. Hertz, commenced in 1887 before the advent of radio as we know it today. In order that the reflector used may be of reasonable dimensions, very short waves must be used and this brings us back to many of the earlier difficulties of radio. Short radio waves are quickly damped when travelling over land or water in much the same way as their prototypes in the world of light blue, indigo, violet and other short light rays are absorbed when passing through fog, leaving only the red or long waves to indicate the presence of the sun which often appears through a haze as blood red disc. Another trouble that was encountered with the short wave reflector system was that the length of the aerial that could be used was limited and hence the amount of power that it was possible for them to radiate was also limited.

These difficulties were eventually hammered out but in the process some interesting discoveries were made. "Working on such short waves varying from 1 to 20 meters would, in the ordinary way, give a perfectly free field, with no interference from commercial stations using wave-lengths from 300 meters up." It was found, however, that considerable interference was experienced from the ignition systems of automobiles and motor boats which apparently emit waves varying from near 0 to 40 meters. It has been suggested that here is a method for checking up ignition systems. In 1922, experiments had advanced so far that the first real radio "lighthouse" became a reality and was erected at Inchkeith in the Firth of Forth. This lighthouse was intended for the use of moving stations, i.e., ships or aircraft not necessarily fitted with receiving reflectors and operated with a revolving beam similar in action to the revolving light of its marine relative.

Cross girders support the reflector, which consists of a large number of vertical wires arranged on a curve and having a shape approximately that of a parabola. Each wire is insulated and separated from its neighbor by a few feet. The whole system acts in a similar way to a mirror that reflects back the light waves from a source of light in front of it.

The Inchkeith lighthouse, being intended as stated above for craft not fitted with special receiving reflectors,

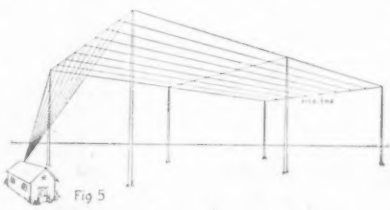

Fig 5

Horizontal Trans-Atlantic aerial—Summary of radial properties of horizontal aerial. Receives and transmits best in a direction opposite to free end. Least radiation in a direction approximately at right angles to the length of the aerial.

sends out two beams 180 degrees apart in the same manner as a lighthouse proper. By means of a small motor the reflector is revolved making one complete revolution every two minutes and at every half point of the compass a distinctive Morse signal is sent out. The only qualification required to determine a bearing by this method is a knowledge of the Morse code. As the beam flashes past the observer the signals will start weak, rise to a maximum and die away lasting in all for a few seconds only. During this time the operator will note the first and last letter heard. Reference to a specially marked compass card will show the appropriate signal for each half point and the direction of the radiophare for the first and last point corresponding to the first and last signals heard.

The midway point of the angle thus formed is the bearing of the observer from the reflector. If the ship or aircraft be near the transmitter, a large number of signals will be heard; if near the range limit, only a few. The practical rule for operating this system is that the controlling handle on the receiver should be turned through successive stops until not more than three distinctive letters are heard. As these short waves weaken very rapidly with distance, with practice a very fair estimate of distance as well as bearing can be obtained. The receiving aerial for such short waves (Inchkeith works on a 6.2 meter wave length) is only a few feet in length and, if the "screening" difficulties can be overcome, seems likely to offer opportunity for use in aircraft.

The Telefunken Compass

EARLY in radio development Marconi discovered the directional properties of the horizontal aerial, namely that it received best from the direction of the free end and possessed the same advantage in transmitting. (Fig. 5.) To summarize this maximum energy is sent out in a direction pointing away from the free end, another maximum of smaller value in the direction of the free end and least in a direction approximately at right angles to the length of the aerial. Experiments have been made for the purpose of "graphing" the radiating powers of various types of aerial, a small portable receiving set being moved around the transmitter in a great circle and the results obtained being carefully plotted. For the benefit of those who would like to pursue this rather interesting angle of radio further, the graphs obtained from various types of sending gear are reproduced here (Fig. 6).

The transmitting properties of the horizontal gave birth to the Telefunken Compass. The accuracy obtainable by this system is not as great as by the use of directive stations but it enables any number of ships or planes to get bearings without communicating an important factor in time of war. Figures No. 7 and 7A show the general arrangement of the Telefunken Compass. "A simple mast in the center supports an aerial of umbrella type and a ring of masts support thirty-two aerials (one for each point of the compass) more or less horizontal and having their free ends at the circumference. All the aerials meet at the center where is situated the transmitting station. The compass operates as follows: a commencing signal is first sent on the umbrella aerial which is non-directional. It is followed immediately by a series of signals transmitted at intervals of one second and sent in turn on each of the directional aerials beginning at North." It follows that the direction of transmission will complete through a complete circle in thirty-two seconds.

By listening to the signals, counting the transmissions and determining the time when the maximum signals are heard, a ship or plane station can determine the direction of the transmitting compass. This determination can be simplified by using a special stop watch with its dial marked out in the form of a compass, and with its hand arranged to rotate once in thirty-two seconds. On hearing the commencing signal, the telegraphist starts the watch and listens on his receiver until the signals reach a maximum when he stops the watch—the hand now indicates the direction of the transmitting station.

The Bellini-Tosi system already mentioned in connection with direction finding can also be utilized for directive transmission, in fact, has been used for radiophare purposes. The examples of directive transmission given above by no

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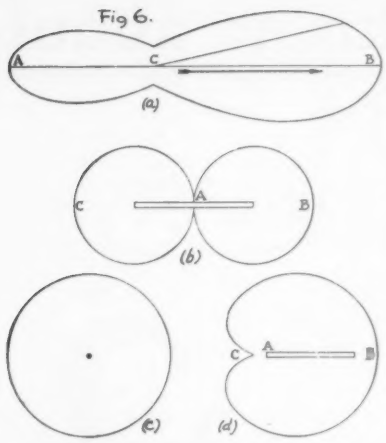


(a) Horizontal—Maximum energy transmitted in the direction C-B. (b) Frame—Maximum energy in the direction of A-B and A-C. (c) Vertical—Radiation equal in all directions. (d) Combined frame and vertical—Maximum energy A-B, none A-C.

means exhaust the subject and various modifications of the principles outlined are being constantly suggested.

Before, however, considering the aircraft installations there is one more "ground fitting" that seems destined to play an important part in aviation and that is the directive guider or leader cable system. Although not, strictly speaking, a radio instrument, it may well be considered here. It is in fact a modification of the leader cable system which has been used with success for guiding ships in and out of harbors in thick weather or when, as in time of war, all shore lights were extinguished. In the case of an airport the cable is laid just below the surface of the ground with an alternating current passing through it. The suggested arrangement is that these cables should be laid along the approach to the airport and part of it in a straight line down the best landing run in the port. In the cockpit of the plane is a detector that performs three operations. Firstly it indicates whether the plane is over the cable, and, if not, denotes which side of the cable it is on. Thirdly it gives information as to the height above the cable.

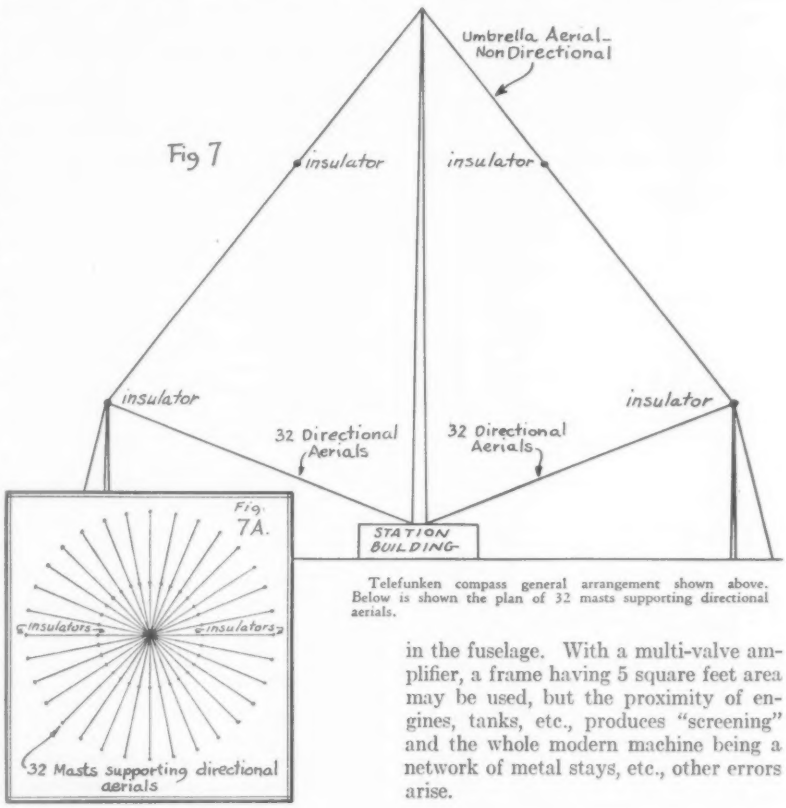
To facilitate the landing it is proposed to use Neon tubes in the form of an eight armed star to mark the center of the best landing area. Extensive experiments have proved that the Neon light possesses remarkable fog penetrating powers, and that even with fog banks 600 feet in thickness, the upper surface of the fog will be brilliantly illuminated with the characteristic rosy pink color that is emitted by the Neon light, while the whole area above and in the neighborhood of the tubes is filled with a most conspicuous and unmistakable red glow. The Neon lights in this case would be placed below ground level and protected with heavy plate glass. This combination of leader cable and Neon lights seems to be full of promise.

Aircraft Installations

AS aircraft increased in size, power and endurance and extended flights became the order of the day, the necessity of keeping in radio touch with the earth became obvious. One of the first of these was the "earth" connection, considered an essential on the land station, but apparently an impossibility in the air. It did not take long, however, to discover that the metal frame of the plane could act as the "earth" and that a long wire trailed from the machine answered for the aerial and this, with the exception of special installations, is the standard equipment of commercial aircraft today.

Telephony at present offers the best results from an aviation standpoint, being at least ten times more expeditious than telegraphy using the Morse code and capable of use by any pilot without any very special radio training. Although telephony, as the general practice in aircraft provision, has been made in some cases for the transmission of Morse code, the planes of the future will probably be equipped with both. Probably the greatest difficulty encountered in the successful working of radio in aircraft is the amount of both electrical and mechanical noise. Space is at present extremely limited and the noise of the engines needs special means to cope with it. Again special precautions must be taken to prevent interference from the waves radiating from the ignition system of engine, each spark plug and its corresponding length of cable forming a small transmitter and emitting a series of highly damped waves. In fact D.F. stations have been able to take bearings of planes at some considerable distance, although the craft was not fitted with radio, the radiation from the ignition system being sufficient to give audible signals. As there may be as many as two dozen spark plugs in one engine, the problem of reception is by no means a simple one. The difficulty regarding ignition has been met to some extent by completely enclosing the ignition system and engine noise has to some extent been eliminated by sewing the receivers into pilot's helmets and by pressing them close to the ears. A further cure will, however, have to be initiated before interference is reduced to reasonable proportions—this is especially true in the case of frame aerials. With the increase of size in aircraft, space will become a less vital consideration and a small silent cabinet for aircraft use will undoubtedly be evolved.

At present there are various types of D.F. equipment used in aircraft, each possessing its peculiar disadvantages. If a rotating frame is used it must be a small one in order to accommodate itself in the fuselage. With a multi-valve amplifier, a frame having 5 square feet area may be used, but the proximity of engines, tanks, etc., produces "screening" and the whole modern machine being a network of metal stays, etc., other errors arise.



Telefunken compass general arrangement shown above. Below is shown the plan of 32 masts supporting directional aerials.

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Another type of Aircraft Direction Finder employs the wing to carry vertical aerial loops and an area of from 100 to 150 square feet can be obtained in this way. Such an installation, however, cannot receive when the plane is flying directly toward the sending station, for the coil will be broadside to the direction of the waves. If signals are heard the pilot is off his course and by swinging his "ship" first to port and then to starboard a point of silence will be arrived at and the course reset. With a beam wind this course is not so easy. If he heads directly for his objective he is making no allowance for drift, and if he shapes a course to allow for drift, he will hear signals that are not required. On the other hand, if he sticks to his radio navigation, he will steer in a wide curve and eventually make his destination heading into the wind.

The Marconi-Bellini-Tosi System has also been fitted to aircraft with some success, the triangular form of aerial usually used on ship and shore stations being replaced by a rectangular form, one mounted athwartships and vertically between the planes and the other vertically and fore and aft. In the present state of D.F. development and in view of the paucity of trained aerial navigators, it would appear as if radio navigation must for some time depend upon the ground position finding stations who will determine the position of aircraft in flight and pass on the information by radio phone. This, of course, renders necessary the carriage by aircraft of the ordinary aircraft sending and receiving set now fairly common.

Slowly but surely astronomical navigation is making its way among the pilots of the air who are in many ways as conservative as their seafaring brothers. The importance of time in celestial navigation has already been dealt with in a recent article in these pages and a word or two about radio time signals may not be out of place. To France belongs the honor of first instituting time signals being broadcasted twice daily from the Eiffel Tower as far back as 1909. Germany followed suit very soon after with signals from Norddeich and there are now over fifty stations in various parts of the world that broadcast time signals at stated times and in accordance with procedure laid down by the International Conference at Paris in 1913.

In the United States, Arlington broadcasts time signals twice daily from 11:55 a. m. until noon and from 9:55 p. m. until 10:00 p. m. Many radiophone stations throughout the country intercept these signals, amplify them and then rebroadcast them on the lower wave lengths. (Arlington sends on 2,000 meters.)

So much for radio navigation. The day is not so far away when aircraft will come and go regardless of visibility, equipped with radio and gyro compass and in thick weather shepherded along their track by D.F. stations until arriving off their port they will pick up the leader cable, follow it, gradually reducing altitude, until the friendly glow of the Neon lights allows him to bring his "ship" safely to rest.

AVIATION STOCKS

[*Continued from page 36*]

down along with the weak. The problem of the individual holder of security issues in general and aviation issues in particular is not one on which blanket or general advice may be given. Each individual security, each individual case, must be decided upon its own individual merits and considerations. One word of advice will cover a large portion of the situation, however, and it is always good advice in the security market. That is that the original investment plan under which securities have previously been purchased shall not be altered or deviated merely because of intermediate market action, intermediate depression or a change in public psychology.

If the individual is holding strong stocks in strong companies, if he purchased them with the original intention of holding them for the long-pull future, without selling on bulges, without selling on intermediate reactions, then the original investment theory should be adhered to.

The position of the trader or the speculator is entirely different. He has bought with the intention of selling and taking a profit, and he is therefore primarily in-

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"Tell him to . . Itemize that bill"

A MACHINE stopped, and a production line suspended operation. Beads of perspiration stood out on the brow of the foreman as he tinkered with the complicated mechanism . . . minutes were slipping by . . . and minutes were dollars.

An expert was summoned. He took a tack hammer and tapped on a terminal . . . the disabled machine whirred into life, and the line went into production again.

Then the expert's bill came in. It was fifty dollars. The superintendent raged, and threw it to his stenographer—"Tell him to itemize that bill!" he shouted.

A statement came back: "Tapping with hammer, $1. Knowing where to tap, $49."

An amusing incident, it shows for the ten-thousandth time that men in the high-salary class are paid for *knowing* more, not for *working* more.

Theory, as opposed to practice, is often a subject of ridicule—but theory, when *combined* with practice, is the source of incomes ranging from five thousand dollars to a hundred thousand.

Theory is another name for the boiled down essence of practical experience. Theory is the worth-while wisdom that pioneers, inventors, and old workers have gained by years of back-breaking effort, heartbreaking failure, and crowning success. By learning the theory of a profession you put the weight of years of experience behind. Big money is made that way!

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"I would like to express my appreciation, Lieutenant, for the courteous attention I have always received from the Institute and the manner in which you have replied to my letters and questions about aeronautics. I feel sure there are very few schools whose instructors and students work so closely together. Your Institution is doing a great work, and I wish you continued success in training men for Aviation."

Samuel J. Forshee, New Orleans, La.

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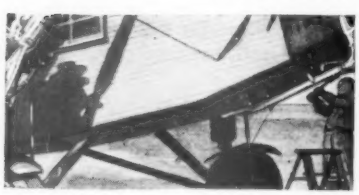

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terested in technical position and in the immediately future course of his holdings. We have previously indicated to this type of trader that commitments in the general market, and especially in the aviation group, should be kept low for the time being.

In previous issues of AERONAUTICS we have warned of such an intermediate reaction as has appeared. We continue of the opinion that the better part of valor still calls for a goodly portion of one's market capital in cash or liquid position and careful scrutiny of both current holdings and any moderate purchases.

The reactions which have taken place during the Fall months in the general market and in aviation issues in particular has done much to strengthen the technical position, and for that reason, granted such careful discrimination, moderate purchases in the stronger issues, from a purely speculative standpoint, may prove wise.

There is no guarantee that the major decline has definitely ended, but there are suggestions that at least an intermediate recovery should make its appearance before very long. Such recovery will be useful, of course, chiefly to the trader who can take his quick profits and run.

On the theory that such early recovery may be temporary, it seems more advisable for the long-term operator to keep his commitments in comfortable bounds, well protected and in the stronger stocks of the stronger companies.

We have outlined some of our more favored issues in previous articles and the list includes Curtiss-Wright, Bendix, United Aircraft, Transcontinental Air Transport, Packard Motors, Goodyear Tire & Rubber, Aviation Corporation of Delaware, Fokker, New York Rio & B. A., and Western Air Express.

While no sustained upward movement is, of course, certain in such issues, they are among the stocks which should rally furthest, and are likewise the safest to hold through intermediate reactions for long-pull investment.

AERONAUTIC LAW

[*Continued from page 31*]

Air Navigation Act, which, among other things, provided that "No action shall lie in respect of trespass or in respect of nuisance by reason only of the flight of aircraft over any property, at a height above the ground which, having regard to wind, weather and all the circumstances of the case, is reasonable, or the ordinary incidents of such flight, so long as the provisions of this Act and any order made thereunder and of the convention are duly complied with." In plain words, flying at a reasonable height over a proprietor's land is in itself not a trespass or a nuisance.

In pursuance of this Act the court, in the case of Roedan School vs. Cornwall Aviation Co., Ltd. (1926), 99 Cent. L. Jrl. 311, dismissed the plaintiff's action for an injunction to restrain the defendant company from flying their planes over and about the plaintiff's school.

Remember King Edward's maxim was "Whomsoever owns the soil owns also the sky and to the depths."

So far, the U. S. Congress has not defined rights in air space, but today about a dozen states have adopted what is known as the Uniform State Law for Aeronautics, which describes ownership of space above the lands and waters of the adopting states to be vested in the several owners of the surface beneath, subject to such right of flying thereover as does not interfere with the then existing use to which said water or land or space thereover is put by the owner, and as is not imminently dangerous to persons or property lawfully thereon.

It is to be remembered, however, that an owner of land or water cannot be deprived of his ownership in the subjacent air, and the rule of law as set forth in the Uniform State Act is valid only insofar as it correctly sets forth the pre-existing law. If, according to the common law, a property owner has a property right in the subjacent air, such right cannot be abrogated by the act in question.

Here is another recent view: In the Minnesota case of Johnson vs. Curtis Northwest Airplane Co. et al. (8 Revue Juridique de la Locomotion Arienne for 1924, P. 138), an action wherein the plaintiff sought to recover damages and enjoin the defendants from flying over his land, contending that such flights, regardless of their heights, constituted trespass, the Court disagreed with the plaintiff's contention and in regard to the application of the common law maxim stated, "The upper air is a natural heritage common to all of the people, and its reasonable use ought not to be hampered by an ancient artificial matter of law such as is here invoked. To apply the rule as contended for would render lawful air navigation impossible, because if this plaintiff may prevent flights over his land then every other landowner can do the same. Condemnation of airplanes is not feasible, because aircraft cannot adhere strictly to a defined course. Common law rules are sufficiently flexible to adapt themselves to new conditions arising out of modern progress, and it is within the legitimate province of the courts to so construe and apply them.

"The air, so far as it is in direct relation to the comfort and enjoyment of the land, is appurtenant to the land, and no less the subject of protection than the land itself, but when, as here, the air is to be considered at an altitude of 2,000 feet or more, to contend that it is a part of the realty, as affecting the right of air navigation, is only a legal fiction, devoid of substantial merit. Under the most technical application of the rule, air flights at such an altitude can amount to no more than instantaneous, constructive trespass. Modern progress and great public interest should not be blocked by unnecessary legal refinements.

"Failure to sustain the plaintiff's contention, relative to upper air trespasses, does not deprive him of any substantial rights, or militate against his appropriate and adequate remedies for recovery of damages and injunctive relief in cases of actual trespass or the commission of a nuisance."

One of the particularly interesting arguments in this decision is that "modern progress and great public interest should not be blocked by unnecessary legal refinements." Public interest assumes a greater importance. There is in this implication that the interests of the group are greater than that of the individual. There is evident in the attitude of all the judges quoted to push the public good farther and farther into what was formerly regarded as the inviolable domain of private right. The science of aviation has thus, in an indirect way, caused law to take a step forward. It demonstrates, with irresistible power, that an element like the air is the common heritage of mankind which cannot be monopolized, and that abstract maxims must yield to human experience.

"C" has an established right to fly over anybody's property. He must not be a nuisance. He is responsible for damages which are traceable to him as the cause—nuisance and damage as explained in the quoted cases.

L. S. W., San Diego, California: In answer to your query as to whether or not states should be allowed to pass aviation laws without consulting the Federal Laws on Aviation: the state has a right to pass such laws as it deems fit and proper, except pertaining to matters where it has delegated its power to do so to the Federal Government.

R. G., Nome, Alaska: The owner of a plane is liable for damages caused by dropping articles overboard while in flight.

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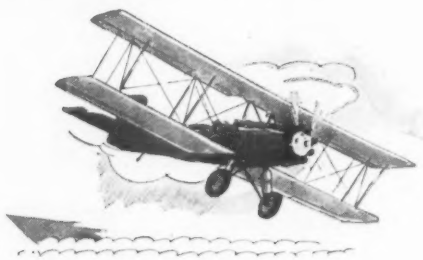

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[*Continued from page 30*]

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Not all passengers are induced as easily to enter a plane for their first flight, however. Our salesmen meet various degrees of resistance among the people they solicit.

The business of selling air transportation calls for a tremendous amount of personal contact. Campaigns in the newspapers and magazines, direct-mail literature, window displays and radio talks serve well enough to arouse general interest. These messages draw many people to the airports. The final appeal, the "sign-on-the-dotted-line-for-a-ticket," is often made during a man to man contact.

Our approach to the public has many ramifications. We send our representatives into offices and business houses seeking customers and we provide for the comfort and entertainment of those people when they evidence sufficient interest to visit the airport. As our depots develop, the public will find in them every convenience to be found in a railway depot, with the addition of entertainment.

We had expected a "long pull" in our quest for customers. We realized much effort would be expended before a volume of business would respond. The organization brought together was conceived on a basis of experience and permanence. It is composed largely of two types of men, those with excellent aviation experience and those with railroad and steamship traffic experience. All efforts of both groups are directed toward the "selling and keeping sold" of the public.

Several methods serve to arouse initial interest. The radio and general publicity combined with both specific and institutional advertising in the daily papers are the foundation. Merchandising tieups with newspapers, wherein the papers purchase transportation at a discount and give it in return for subscriptions, succeed in getting many into the air. A similar arrangement with department stores and other large business organizations not only gives us wide advertising but also increases receipts for the local passenger business. Firms purchase tickets at a discount and give them out to clerks as rewards for efficiency, increased volume of sales, etc.

Passenger business over the longer lines must come first from individuals enjoying larger incomes and from those whose duties require speedy travel between cities. This is manifest because present tariffs do not permit the man of small wages to use air travel. It is because of this economic fact that our salesmen call daily on professional people and others influential in the community seeking to sell them on the advantages of travel by air.

I find it difficult to discriminate between methods of obtaining new and repeat business, except that one trip in the air usually breaks down considerably the resistance. Immediately following a journey between any two points our sales organization sends a letter of appreciation to the traveler, including a folder explaining the scenic beauties and enjoyment to be had on other routes.

These are in a sense routine sales methods, yet they have not been applied in these forms generally by air transportation companies. We have endeavored to personalize flying, carrying to the customer the idea that we are interested in his particular convenience in going from city to city. This is further carried out by the operation between Los Angeles and San Francisco of two types of service. A non-stop express plane on which is charged a slightly higher tariff carries those who wish to spend the minimum time in the air. Another plane stops at intermediate points to permit local travel.

We do not consider our obligation ended with the sale of a ticket. It only commences at that point. The passenger who trusts his life and his time to our equipment becomes in a sense a ward for whom we must care until we deposit him in the center of his destination city.

Efforts are directed not only toward providing for his safety, but also for his comfort and *entertainment*. The entertainment feature is important, especially for those in the air for the first time.

The passenger reaches the airport either in his own car or in an automobile supplied to bring him from the metropolitan area to the depot. In either case, his physical troubles cease at the point of first contact. Employes take his baggage and check it through. Until plane time, to paraphrase the railroad term, he wanders through the depot or otherwise cares for himself.

Then the plane is announced. In the case of departure from Grand Central Air Terminal he walks through the covered depot down to a covered arcade—a canopied, glass-sided tube—directly to the open door of the plane. He suffers no inconvenience from sun, wind, dust or rain—or from the blast of the ship's propellers. For him have been eliminated jay walking hazards and weather discomforts.

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The fact that the pilots are visible is important. Usually the "first timer" in the air feels some nervousness at intervals, but when he looks forward and sees the plane captain (first pilot) and his mate (second pilot) conversing and possibly laughing over some joke, he realizes danger not only is not real, but also is not really apparent. His fears are ill-founded, for no reputable commercial air transport company dispatches a plane when danger in any guise threatens. The weather man furnishes complete information of conditions ahead and no pilot will take up a plane which is weak in any part.

At intervals the mate leaves his post to inquire whether passengers are comfortable, to ask if he can do anything for them. This puts at ease any who thought themselves out of their proper element. He points out interesting landmarks, explains that the pilot is flying at an altitude of 9,000 feet to take advantage of a 30-mile tail wind, tells them other interesting things about the route.

Usually, however, both the captain and mate (who is thoroughly qualified to handle the big plane) sit in their cabin, going about their routine business of going places and arriving there on schedule. If they are slow, they speed up a bit; or if they are ahead of time they slow down.

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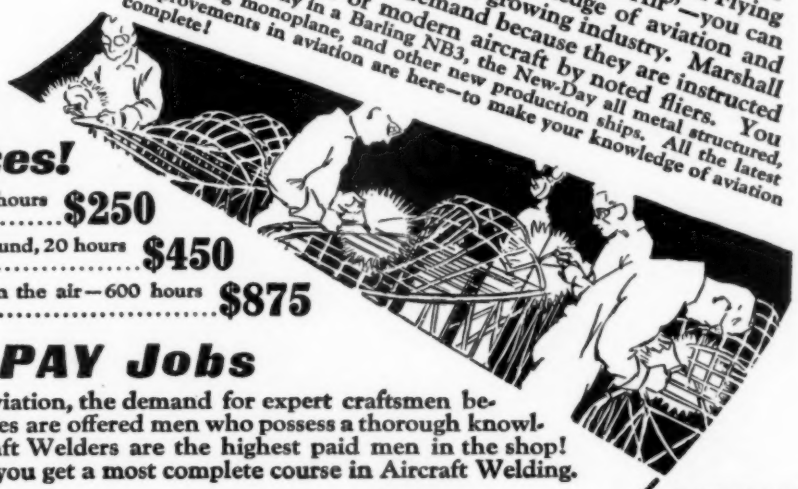

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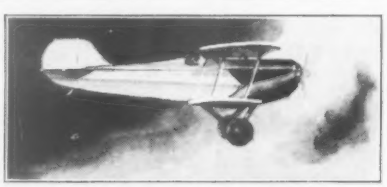

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FEDERAL CONTROL

[*Continued from page 17*]

and changing voice just as all growing youths experience.

During their immature years youth are given the same sort of training and regulation the aeronautical branch of the Department of Commerce is giving our youthful industry. Children are not asked to survive strict regulation, for experience has taught that such training would not be wise. Likewise, aviation would not survive such regulations as Representative Cable suggests—regulations that would grant monopoly franchise, regulation of rates, service, equipment and other things.

Few air lines have been in existence long enough to demonstrate or permit of a decision as to whether they are serving the public adequately between our larger cities. We believe that competition should be permitted to the fullest extent. Wise management and superiority of service will determine which company shall survive.

Several years ago there were many people who thought the chain stores springing up beside the old fashioned grocery store of Bill Jones' were a great menace. There was considerable talk and pleading for legal measures which would prevent the establishment of such chains. Yet, today, we find chain stores everywhere. True, many a merchant who refused to be modern was forced out of business. Others became modern and have prospered. But those customers who left Bill Jones to shop at the up-to-date chain stores are happier and better off than had they continued to do business with him. The same situation will be true of air lines: If a company is forced out of existence because of antiquated methods and equipment by a more modern line, offering a greater service, the public will benefit. And it is the public one must always consider.

Furthermore, it seems to us that such a statute as is suggested would be the basis for the establishment of a great number of air lines, poorly managed, poorly financed and utterly inefficient, as there would be the temptation for many hurriedly organized companies to secure an exclusive franchise in order to sell it later on at a huge profit—offering only an indifferent service during the time the monopoly franchise remained in their possession. Permitting the establishment of air lines to continue, unshackled by red tape and unnecessary statutes, as they are now, all operating companies are compelled to give their best, spurred on by healthy competition.

Then too, it has often been the case in the past that when the yoke of legislation was placed over an industry, politics has entered into it. And it is logical to believe the same would be true in this

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case as the authority to award a certificate, or franchise granting the right-of-way would become a favor, "a political plum, handed out to friends."

In addition to the above evils which one might anticipate as the result of the statutory regulation Congressman Cable believes necessary, what is to prevent the body having the power of granting exclusive franchises from awarding the most promising and lucrative routes to one operating company? Such procedure is highly probable, for that old bug-a-boo, politics, would undoubtedly see to that. And we do not believe it is the desire of Congressman Cable to see the control of all major air lines placed in the hands of one large organization.

A majority of the passenger air lines in the past have been outgrowths of air mail routes, and the awarding of air mail contracts is in the hands of a governmental organization—the Post Office Department. Contract mail routes were and are awarded on the basis of the lowest bid. The Post Office Department, when opening a mail route, advertises for bids and sends notices to all air transport operators, thus giving all equal opportunity to secure the contract without possibility of political favor. In a manner this is giving an exclusive franchise to an air line to operate between certain cities, for the operator is assured of a pseudo-subsidy by the revenue he obtains from his mail contract and he is encouraged to conduct passenger service.

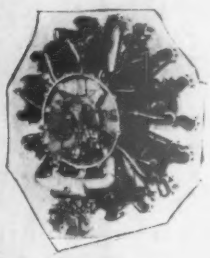
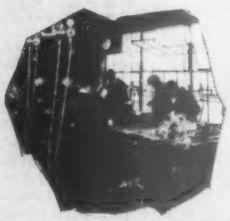
We believe passenger lines will continue to come into existence in this way for some years. They will naturally have the advantage over any other line which might spring up. But they will be spurred on to render a more efficient service because the Post Office Department specifically states in all air mail contracts that, providing adequate service is not rendered by the mail operator, it shall have the power to break the contract or award it to another operator.

Also, because this infant industry is still in its formative state, the organization or body that attempted to set and regulate rates would be treading on extremely dangerous grounds. First, the operators would not willingly submit to such action. Second, there would be continual friction between the operating companies and the body which set the rates as they would claim another line was given preference over their own. Then there is the almost unsolvable problem of knowing how the rates should be adjusted, for the air lines do not yet have standard equipment as have the railroads. A plane which will serve nearly 100 per cent perfect over one route would not be at all satisfactory over another of equal length. And the cost of operating a plane over one route may be greater or less than the cost of operating the same type of plane over a different route of the same mileage. So, until more uniform equipment comes into general use, the question of rate fixing would be better let alone.

Therefore, our reasons for believing Congressman John L. Cable's proposed measure unnecessary and undesirable at this time are as follows:

1. The industry could not survive strict legislation.
2. Few lines have been in existence long enough to permit judgment as to whether their service is adequate.
3. Such a statute would cut out healthy competition which is so vitally important.
4. It would tend to bring about poor management and inefficient service.
5. It would very likely put the regulation of all air lines into politics.
6. The establishment of uniform rates, fair to all operators, is impossible at present.
7. Small, but efficient transport companies, which if let alone could survive, might be forced out of business.

Consequently, because any one or all of the above mentioned evils might result from the proposed statute, we do not believe Congressman Cable's bill would have the desired effect at this time.

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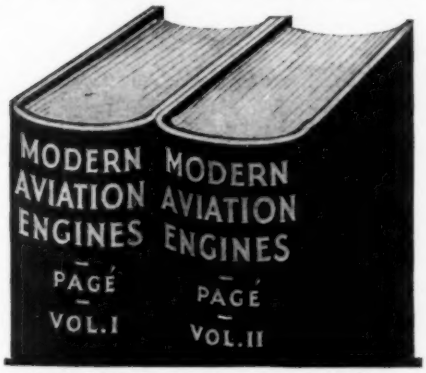

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Another article by Gen. Wm. Mitchell will appear in the next issue.

AIRPLANE IN SALES PROMOTION

[*Continued from page 35*]

way if these people lived 20 miles from my Rapid City agency.

"Now the average dealer will say—'He still hasn't sold his car, he has nothing to show when he arrives.'

"That is very true and the sales are not made while the airplane is in sight, but the fact that the dealer can offer swift aerial service when service is required carries considerable weight with the farmer who wants his car badly when he wants it.

"It is much easier to get a rancher to stop work for a short time to talk car if you land your ship right alongside his tractor and plows, than if you drive a new car to the same spot. The airplane wins his attention and friendship for the salesman and I have found that is needed before automobiles can be sold. Then when the new car is driven to his home he will look it over carefully and the chances of a sale are increased greatly."

Recently Barlow dropped in on three farmers twenty-five miles from Rapid City and did not leave his garage until five o'clock in the evening. In other words, a working day saved. Two of these men were plowing stubble fields and Barlow landed his plane within 50 yards of their machines. Said one, "Young fellow, that's the first one of them things that ever lit on this ranch." He was immediately on warm terms with the dealer. Barlow is absolutely certain he could never have sold this man a car with the usual procedure of sales talk.

"There is something about flying," says Barlow, "that holds the attention of the public and anyone more or less actively engaged in it is of course better known than the man who isn't, with a result that when I call on a prospective purchaser with a demonstrator car the prospect will often ask questions concerning flying and thereby create a feeling of friendliness that will make the selling of the car easier.

"And then there is the pleasure of flying that goes with this method of selling automobiles. I have been flying for nearly twenty years, and I feel that I am just as safe in the air as on the ground. I might add that other automobile dealers in the future will find, like I, that the use of the airplane will increase their sales if their territory is fairly large."

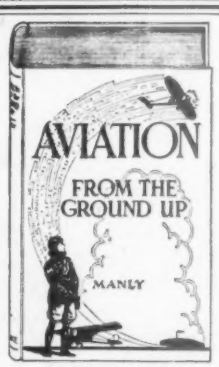
A very convincing letter. We have many other instances of automobile men using airplanes to increase sales, either directly or indirectly. One dealer in a western farming community advertises rapid airplane repair service. He relates that he received a phone call from a farmer stalled 40 miles from town. He hopped into an Eaglerock and within 45 minutes had repaired the trouble. Later, as a result of this prompt action, he sold new cars to three of the man's neighbors.

Another outstanding example of an automobile man who utilizes aircraft in promoting more automobile sales is R. G. Smith of Rome, N. Y., one of the largest Ford dealers in the East.

Smith uses his Ox5 Eaglerock on business trips to neighboring towns. Recently he sold two new trucks to a large contractor doing a rush job on a time limit penalty contract. The sale was made on condition the trucks would be ready for duty the following morning. Smith loaded two mechanics in the front cockpit of his plane and flew them to Buffalo, over 200 miles away. He then flew home and that night the two trucks were ferried through to Rome, arriving in time to complete the sale. Without the plane Smith says he could not have fulfilled the terms.

Every airplane owner can afford an automobile and he usually drives a late model. An automobile agency using or dealing in aircraft naturally arouses his favorable interest. He will nine times out of ten look over the dealer's cars carefully before making a purchase.

Participation in aeronautics in any form lends free publicity and immense prestige to an automobile firm. The public has grown to look to the automobile industry and the automobile dealer as prophets of year-to-year progress. In few other fields does "keeping ahead of the times" pay bigger returns.



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BRIEF NOTES FOR THE MONTH [*Continued from page 64*]

tica Transportes whereby Los Angeles and Mexico will be brought within 32 hours and 15 minutes of each other.

Inauguration of air service between the various Hawaiian islands was to start about Nov. 15, Stanley C. Kennedy, general manager of the Inter-Island Airways, Ltd., Honolulu, announced.

A twelve-passenger Reo observation bus has been put into service by the Universal Aviation Corp. to convey passengers between downtown St. Louis and Lambert Flying Field.

The Aviation Corporation's fleet of 300 planes flew 562,059 passenger miles on its 10,000 mile transport system in September without accident, carrying 5,150 paid passengers.

Movies will be shown as a regular daily feature for passengers of the transcontinental transports. A program of news reels and comedies will be changed twice weekly.

New York to Omaha airplanes may now operate on radio directional beams furnished by radio range beacons along the route. The beacons are set every 200 miles.

A new feeder air line has been opened between Wichita and Omaha—to connect the transcontinental and mid-continental air routes.

St. Louis will be included in the Chicago and New Orleans air line, Major M. D. Mann, president of the Continental Air Services, announces.

The Frank Martz Coach Co. has augmented its bus service with a Bellanca monoplane for use between Wilkes-Barre and Newark.

A cut of $6 in fare between Detroit and Chicago was announced by the Stout Air Lines. The new fare is $24.

Scenic Airways, Inc., announce a daily air service between Nogales, Ariz., and Salt Lake City.

The New York Automobile Club announces establishment of an air travel division.

SCHOOLS

An Air Law institute has been incorporated by Northwestern University "to furnish instruction and information concerning air law in all countries of the world, and generally to promote the sound development of air law in the United States." Fred D. Flagg, Jr., is managing director.

Aviation training courses are announced by the Joliet, Ill., township high school. The theory of flying is stressed and instruction is given relative to airplane engines in connection with the fourth year work in auto mechanics.

A course in airplane transportation, outlined by Professor Earl W. Hill of the University of Southern California, has been adopted for use in California high schools by the state advisory committee on aeronautical education.

Slow motion pictures will be projected in classrooms of the Spartan School of Aeronauties, Tulsa, Okla., to show in minute detail the most common errors in flying.

The Spartan School of Aeronauties has been approved by the Department of Commerce.

WHERE IS THE INDUSTRY HEADING?

[*Continued from page 20*]

panies relying upon normal travel and shipping will go farther than those placing reliance on the practical subsidy that an air mail contract constitutes. Manufacturers who seek to build a general receptivity by the public and greater business for transport operators will be in a position to sell these same transport companies what should be rapidly increasing equipment. As a bulwark for a sound business this should be far more satisfactory than the selling of lump output to the army and navy.

If those who manufacture light planes and engines would cease sneering at mere enthusiasts and start to cultivate them instead, they would find themselves on a steadily rising market.

The reason for the present self-evident depression is the unlicked ego of many of the present executives in the industry. The industry has turned its back to the greatest and most valuable publicity ever handed gratis to any of man's enterprises and has sought to *sell its products to itself*. It needs principally a new point of view and a few more normal-minded executives. It requires to rid itself of the short-sighted, clannish-minded play-boy type. It needs signally less mystery and less side-show foolishness.

With a stable business at home, export trade may be rapidly developed. American aviation with a rich and enterprising nation behind it should make an even more signal success of its aircraft industry than it did with the automobile industry. Those who truly understand the vast commercial possibilities of modern aircraft will not view this as an exaggeration.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912

Of Aeronautics published monthly at Chicago, Illinois, for October, 1929. State of Illinois, County of Cook, ss. Before me, a Notary Public in and for the State and county aforesaid, personally appeared William B. Ziff, who, having been duly sworn according to law, deposes and says that he is the editor of the Aeronautics and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit: 1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Aeronautical Publications, Inc., 608 S. Dearborn St.; Editor, William B. Ziff, 608 S. Dearborn St.; Managing Editor, William B. Ziff, 608 S. Dearborn St.; Business Manager, William B. Ziff, 608 S. Dearborn St. 2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) Aeronautical Publication, Inc., 608 S. Dearborn St.; William B. Ziff, 608 S. Dearborn St., David Ziff, 608 S. Dearborn St.; B. Geo. Davis, 608 S. Dearborn St. 3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None. 4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him. William B. Ziff. Sworn to and subscribed before me this 23rd day of September, 1929. A. T. Pullen. (My commission expires 1-25-32.)

"I'LL BE RIGHT OVER"

WHEN David M. Parry, wholesale manager of the Archer-Mann Company, St. Louis distributors of Marmon-Roosevelt automobiles, tells a dealer that he "will be right over" he means just that, no matter how great the distance to be covered.

Mr. Parry is one of the few wholesale automobile men in the middle west to make use of an airplane in his daily routine of promoting sales of Marmon-Roosevelt cars. In covering the territory of the Archer-Mann Company, Mr. Parry frequently goes from one city to another in his own plane, and always chooses this mode of travel when speed is the main requirement.

Mr. Parry is a qualified aviator and has been flying for over 12 years. He has 1,153 hours of flying to his credit, of which 800 are shown on his war record, and were gained in actual service during the World War, where he first developed a fondness for aviation. His Eaglerock biplane is maintained at the St. Louis airport, ready for instant use.

Gratifying results have been accomplished through Mr. Parry's use of his own plane in the daily business of selling automobiles. Partly through his efforts, sales in the territory of the Archer-Mann Company have increased tremendously. Mr. Parry has found that the time he saves in making calls on dealers, and the wider scope of activities made possible by a quick method of transportation more than pay for the actual cost of operating his plane.

David M. Parry (right) and C. H. Sadons, Marmon Motor Car Co.

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WOMEN AND AVIATION

[*Continued from page 52*]

dent. The reason for this remark is obvious to anyone who has ever met this type. She is so frolicsome. The instructor is greeted with a veritable spring freshet of words. It is, "Oh, how do you do, Captain." You are always captain to these babies. "Oh, I'm so thrilled. Do you know, I always did want to fly. Why, when I was a little girl I was nearly the death of my poor mother. I was forever climbing up trees and things like that. Oh, Captain, please teach me how to do those perfectly thrilling flip-flops, won't you? I am not a bit afraid. When I was a little girl I was a regular tomboy, nearly the death of my poor mother . . . ." on and on until the peaceful roar of the engine drowns out her pipings. To be supplied with a new and engaging topic of conversation is the Talkative Woman's prime reason for trying to crash into aviation. Of course, the publicity possibilities are not to be sneezed at. She fails utterly in her attempt owing to the fact that she is constantly asking questions and expressing her own opinions, allowing no time for her to learn anything. Wilbur Wright once said that the only bird that can talk (the parrot) cannot fly a lick. That goes for the hens (or chickens, if you will), too. Our gabby girl shortly gets annoyed by the fact that she is not learning to fly. This annoyance soon becomes just plain ordinary huff and she leaves the field in tidal wave of words.

What I have colloquially called the "Good Egg" type of womanhood is the sort of woman who draws whole-hearted admiration from all with whom she comes in contact. I grant you that slang is not sound rhetoric, but it is expressive. And in naming the type "Good Egg," I purposely try to express as forcibly as possible my high appreciation of that sort of a woman. She, to my way of thinking, is perfectly marvelous.

There is nothing petty or catty about her. She is wide open and above board in her dealings with both men and women. There is nothing of the shy little buttercup about her. She is modest, yes, but not to the point of losing her self assertion. Petty jealousies are not included in her scheme of things.

Whatever smallness came out in the Air Derby came from without the ranks of the pilots. When the Good Egg takes up aviation she sets a goal and keeps plugging along the road to attainment of this goal. The multitude of setbacks, the hard bumps do not dismay her one iota. She keeps her chin up and a smile in her eyes. Flight instruction is not so hard for her. With ordinary native intelligence anyone can learn when and how to kick rudder after a time. But our Good Egg is endowed with the gift to learn from observation, which, I might remark, is an attribute that will bridge many a detour on the road to commercial flying.

Your reporter, gentle reader, repeats that he has given you a professional airplane pilot's views on women in commercial flying. Sports flying hasn't been considered for a moment. But now that that has been brought up permit me to air a passing observation:

Aircraft design has been progressing with such astounding strides, in the past few years, that we have arrived at a place now where they are quite safe to fly, and particularly the light sport models. However, I must qualify this statement by saying that they are just as safe as the human element involved in flying them. So, what with the engineering progress recently, the easy natural motions that go with flying, plus woman's high determination, I feel quite safe in saying that woman's place in aviation is right in the cockpit of a ship.

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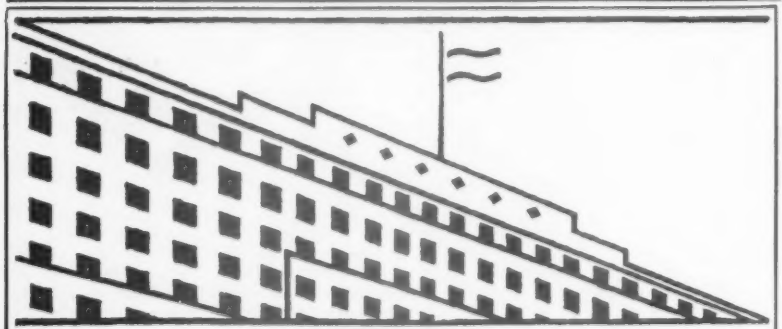

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PUBLISHER'S QUILL

[*Continued from page 13*]

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WOMEN'S ACTIVITIES

EDITED BY LADY MARY HEATH

AERONAUTICS is very happy to present a renewal of the inimitable monthly news and views on women, written by Lady Mary Heath

The initial report of the French "Tourisme" air race was very rapidly contradicted and Miss Spooner was put out of second into sixth place. So was Brond, flying the familiar Gypsy Moth. He was originally designated as leader.

Miss Earhart's Vega has greatly gone into abeyance since her fine appointment as assistant manager to T. A. T. She should bring very much traffic to that body.

There are three women on the Ford Tour with three fine machines. It will be most interesting to see how they place. Mrs. Keith Miller, who is the England-Australia pilot, is on a Fleet. Mrs. Haizlip is piloting a Spartan, and Miss Hassell is on a Gypsy Moth.

Mrs. Thaden is still flying whenever possible. Her magnificent work in winning the Women's Air Derby has given her an unassailable position among pilots.

Three more women have taken their pilot's licenses, bringing the total number to sixty in the United States. Few other countries can even approach half this fine number.

There are at present seven women employed in aviation in the United States. With the present influx of women, we should have ten before the beginning of the new year.

The most serious accident that has befallen a woman occurred to Miss Marvel Crosson in the National Air Races. She was killed owing to the non-opening of her parachute. Her loss is very greatly felt among all women aviators.

It is good news to hear how happily Ruth Elder's romance is progressing. There are few people in aviation who were not very glad to hear of it.

The Irving air test-chute trip is finished. We hear of Eleanor Smith once more at her home in Long Island.

I see that women aviators are preparing for their own organization. The call for a meeting to decide on that was issued by four New York women at Curtiss Field, Valley Stream, L. I.

Miss Marguerite Drew has the distinction of being the first woman to receive a private pilot's license in Hawaii. All over the world women are turning more and more to this finest of work.

How even the older people are taking to the air was shown when the Duchess of Bedford flew with her pilot from England to India and back. She is 63 years old.

I am interested in the activity of college women in aviation. To my desk comes a report that three girls, one from the East, one from the Middle West and one from the Coast, have been awarded flying courses in the Alexander Eaglerock competition.

Miss Zora Koritnik has been appointed air traffic representative for the Universal Air Lines System in St. Louis. That she will make good in this as other women have in pilotage is unquestioned.

In the news also is the report that Miss Laura Ingalls has received a limited commercial pilot's license. She is the first woman to achieve this in a St. Louis school. Miss Ingalls learned at Universal.

The business angle of aviation is really a fine avocation for women. Miss Vida B. Kinder also thinks this, as she has enrolled for the business course at Universal.

I was keenly interested in the flight of Mlle. Lena Bernstein, the French aviatrix, who flew from Istres to Chaloum, near Cairo, a distance of 1,677 miles. Her feat shows that women are able to compete equally with men, for she broke the record of a year, made by Captain Tritsch.

The first air saleswoman in England made her debut at the International Exhibition at York. She is Miss Winifred Spooner.

How women in London are taking up aviation is seen in an article sent to me which was printed in the Daily Mail. The article tells about tea parties in airplanes, 3,000 feet above London. Tea over London, the Mail adds, "looks like becoming an institution."

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The author is Lieutenant Logan C. Ramsey, United States Navy. He is a naval aviator and an acknowledged authority on avigation. When the United States Navy started its section of aerial navigation for the Hydrographic Office, Lieutenant Ramsey was selected from the entire naval personnel for the work. He instituted the section and was the first officer in charge of it. His interests in navigation have always been directed toward the aerial branch. How much you profit from this viewpoint can be realized only by actually seeing the book and considering it in relation to your personal needs.

You cannot become a transport pilot unless you know aerial navigation in all its phases. This book will qualify you on all points. It sets a proper balance between the three branches of avigation, piloting, dead reckoning, and aerial astronomy, something no other book accomplishes. In actual working value it stands alone—its 234 pages give as useful and vital information as can be bought—Ramsey is as practical as bread and butter.

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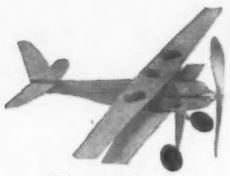

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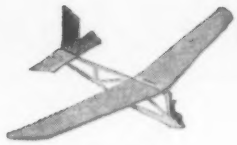

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MODEL DEPARTMENT

by Bertram Pond

THE FLYING WING

ALL of the model builders, I know, have been following the many fine articles in AERONAUTICS, and no doubt have noticed in various past issues descriptions of some of the more interesting types of planes developed for the Guggenheim Safety Competition for man carrying planes.

The Hill Flying Wing type of airplane is one of the unique designs suggested as a possible winner of this competition. In this issue we offer to our readers a very interesting rubber driven model of this type of machine. This model was suggested to us by one of the enthusiastic model section readers of San Antonio, Texas, Mr. Paul Morales. This machine, when properly built, needs no elevators and probably could fly satisfactorily without the fin under the wing.

Before giving a detailed description of the construction of this model, let us study the drawings for a moment so that you will be sure to understand the principles involved which make this plane stable in flight without elevators. You will notice that the wing has a higher angle of incidence in the center than it has at the sweep-backed tips. This difference in angle of incidence between the most forward and the rear portions of the wing act in the same manner as the wing and the elevator of an ordinary airplane in producing stability. Of course our Flying Wing Model must be balanced for flight by shifting the motor base to the proper balance position as determined by trial flights.

The other features of the machine are the tapering of the wing in the plan view and the slight camber of the ribs in the main wing. You will note that the machine is operated as a pusher on a standard 15" motor base. Two strands of ⅛" x1/32" flat rubber will fly the model quite satisfactorily with plenty of pep though the model can be made to fly on two strands of 3/32"x1/32" rubber if the model is made fairly light throughout.

Avoid attempting to use a much larger diameter propeller than specified on this model as the tips of the blades are liable to interfere with the wing and perhaps damage the rear wing beams. Of course the lighter the propeller is made, the farther the motor stick can project to the rear and the larger the propeller which can be used without interfering with the wing.

Because of the simplicity of the Flying Wing Model you will only need the following materials to construct your first model:

1 balsa motor stick ⅛"x5/16"x15"
1 balsa propeller blank ¾"x1⅛"x7"
8 balsa strips for wing beams, fin and ribs 1/6"x⅛"x12"
1 bottle of Hoosier Glu
1 bottle of paper cement
1 coil of No. 8 (.020") music wire for the wire fittings or one set of fittings already formed
1 small thrust bearing
2 small thrust washers
1 piece of Japanese tissue paper
1 piece of ⅛"x1/32" flat rubber about 32" long
1 can rubber lubricant.

The construction of this model will be simple to those who have built indoor tractor models but we will give sufficient instructions so that the beginner need not hesitate in attempting the construction of this most interesting machine. In fact, a beginner can learn a great amount about models from the building of a model of this design. Be sure that you read all of the instructions carefully and study the drawings before beginning to build your model. You will understand what you are trying to build and in addition you will be able to save yourself considerable time by working on several parts at one time. While the glue is drying on one part you can work on another.

Make the wire parts to the actual size of the pattern shown in the drawing. Fit the wing clips to the motor base, snugly yet not too tightly. Dip both ends of the motor stick into the cement about one-half inch and allow the glue to dry. Pierce the front hook into the end of the motor base and cement it securely in place. Mount the bearing onto the rear of the motor base with several coats of cement. Allow one coat to dry before applying the second. Cement the "can" to the center of the motor base with one coat of glue.

CONSTRUCTING THE WING. It will be a help in making the wing to prepare a full sized drawing on a large sheet of paper to use as a pattern in cutting and cementing the parts together.

If you wish to make the wing very light you can taper the wing beams from the 1/16"x⅛" section at the center to 1/16" square at the tips. The center rib, you will note in the drawing, is 1/16"x⅛" balsa. The other ribs can be 1/16" square

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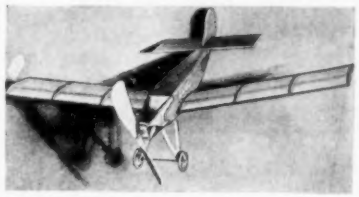

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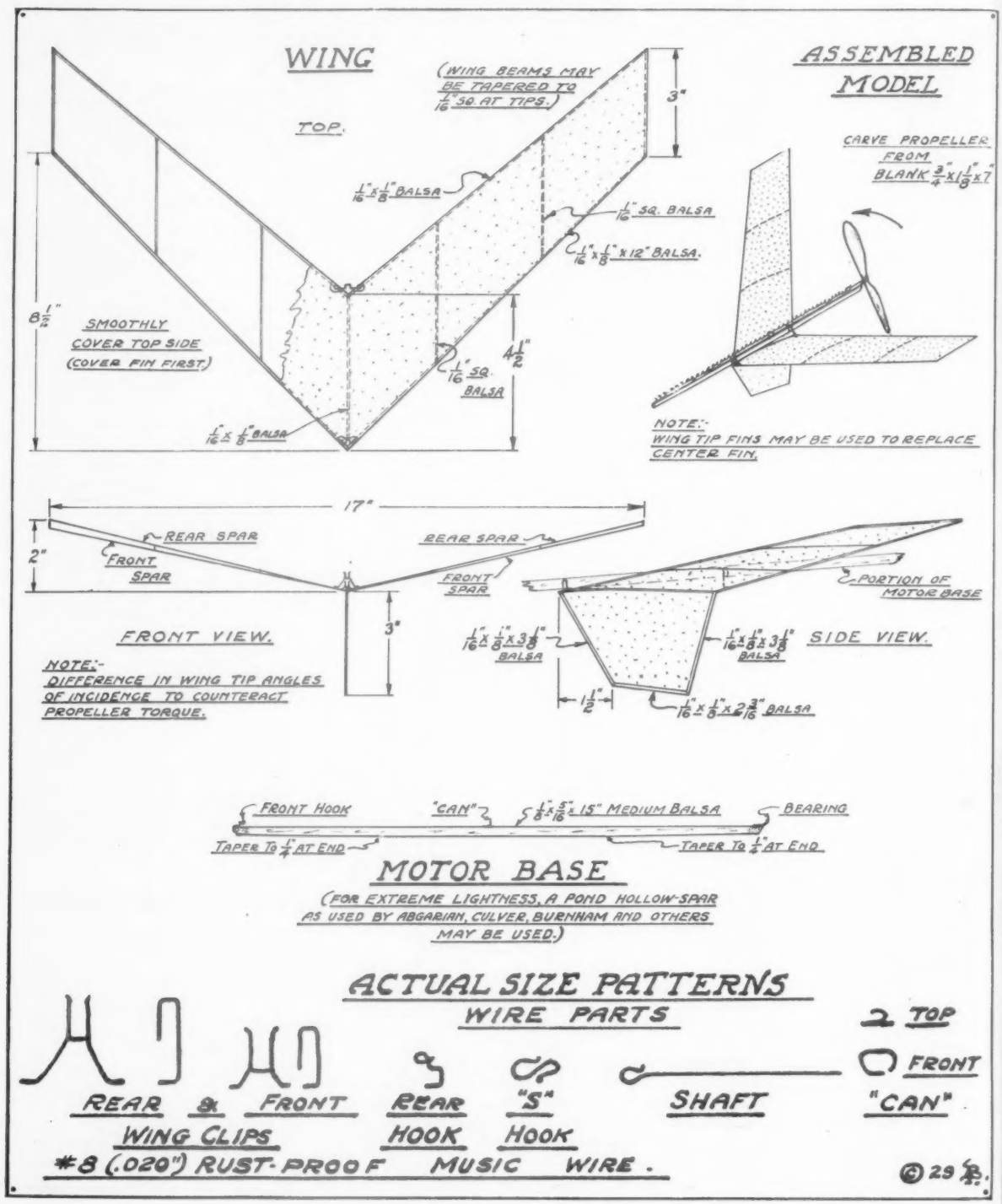
or smaller, depending upon the stiffness of the balsa wood used. Cement each wing half together separately, using the full size pattern to lay the parts on while being cemented. There should be only a very slight curve in the wing ribs. This should amount to about 1/8" in the center of the rib and taper to 1/16" in the second ribs, 1/32" in the third ribs, and the wing tips should be flat. This difference in camber adds to the stability of the tapered sweepback wing as well as the difference in incidence. Put the high point in the camber of the ribs to the front part of the wing halves.

After you are certain that each part in each wing half is securely cemented together and entirely dry, you can join the wing halves together. Place a book 2" high under each wing tip and place the center ends of the wing beams together.

Working diagrams and specifications of the Flying Wing Model.



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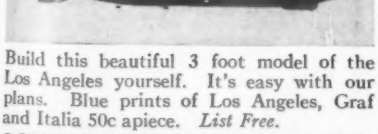

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Cement the joints with a generous coat of Hoosier Glu and allow to dry for one-half hour. Fifteen or twenty minutes might be sufficient but do not take any chances on your work being spoiled by the joints coming loose through unnecessary haste. Turn the wing over and cement the bottom of the spar joints with a thin coat of glue. You should support the center part of the wing during this operation with a block 2" high to prevent the wing from losing its correct angle. Now attach the wing clips in place, using several coats of glue.

The fin can be constructed next. It is simply composed of three pieces of light balsa wood rib stock cemented together to the pattern shown on the drawing.

Before papering the wing you will find it more convenient to paper the fin. Cut the paper slightly larger than the shape of the fin, being as careful as possible to keep the fin surface free from wrinkles. Carefully paper the wing, using two pieces of paper, each slightly larger than one-half of the wing. Fasten the paper down to the center rib with paper cement; and with the thumb and forefinger of both hands work the wrinkles out of the paper as you slowly cement the wing beams out toward the tips. Do not attempt to cement all of the wing beams and ribs at one time as you can not work the wrinkles out of the paper fast enough to stretch it evenly. After the paper is carefully cemented down and wrinkles removed as much as possible, carefully remove the waste edge of paper around the wing.

Slip the motor base in place in the wing clips and then assemble the wing carefully by sighting along the under side of the motor base. There should be practically no angle of incidence at the right wing tip and a small negative angle of incidence at the left wing tip, while at the center of the wing you can see the full amount of incidence caused by the difference in height of the wing clips. The difference in angle of incidence between the right and left wing tip, you will recall from your previous model experience no doubt, is necessary to counteract the tendency of the model to rotate in the opposite direction from the rotation of the propeller. (This is known as propeller torque.) Among model builders and readers of AERONAUTICS Model Section this difference in angles of the wing tips has come to be known as counter-torque.

PROPELLER. The propeller is carved from a blank ¾"x1⅛"x7". The usual simple method of carving a true pitch propeller as described in the November, 1928, issue of AERONAUTICS should be used. Briefly you will recall that these operations consist of drawing diagonal lines from corner to corner on opposite faces of the blank, carefully marking the hub and piercing the shaft

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hole; 2. Carving the propeller shape to the guide lines, leaving the blade thick at the hubs, and thin at the tips; 3. Sanding and balancing the propeller to the desired thickness; and the next point, 4, finally rounding the tips, cutting down the hub at the rear and installing the shaft and washers. A right hand propeller should be used with the counter-torque corrections we have given. Remember that this propeller is a pusher propeller and that the shaft should extend to the front of the propeller. Be sure that the shaft is securely cemented in place.

FLYING THE MODEL. Tie a square knot in the rubber, leaving very little sag in the rubber when it is hooked into position between the S hook and the propeller shaft through the "can." For long flights, use a small amount of lubricant on the rubber and give it extra winds. The rest is simple. With the wing in place, give the model a few trial glides and wind it up for a bit of thrilling experimentation in the field in which such leaders in the aviation world as Guggenheim and Lindbergh are so earnestly interested.

LOUISVILLE TOURNAMENT

THE Third National Playground Miniature Aircraft Tournament held at Louisville, Ky., proved to be one of

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MODEL BUILDERS—Here is a brand new development in a model plane for you—an endurance model. It has many novel features that give it endurance and flying qualities that you have never before experienced. It will stay in the air for a minute—a minute and a half or more. It is very light—weighs less than an ounce—and practically crash-proof. You can fly it again and again.

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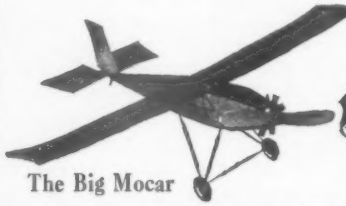

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Bertram Pond (extreme left) and "Tom" Rivers (extreme right) congratulating Edwin O'Donovan and Ernest Marcouiller, winners of AERONAUTICS' cups.

the best national model contests ever held.

The local committee, cooperating with the Tournament committee under the chairmanship of A. H. Bowman, contributed much to the success of the meet by the efficient manner in which they conducted the local arrangements.

One of the surprising results to everyone was the number of long, beautiful flights made in the compressed air model events. When the compressed air event was all over there was no doubt left in anybody's mind that this was the most spectacular and most interesting feature of the whole program. The record flight was made by Harley Rich of Knoxville, Tenn., with a time of thirty-five seconds. It can be expected that by next year this record will be surpassed, with stronger landing gears to protect the propellers, with lighter fuselages and wings and with more experience in flying the new type of model.

The first three cities in number of total points scored were: Chicago, 65 points; Washington, D. C., 38 points; and Knoxville, Tenn., 26 points.

In an effort to encourage the fine interest shown in flying by the American youth, AERONAUTICS donated the championship trophy cups and medals.

Following is the list of cup winners: Edwin O'Donovan of Topeka, Kansas, 16 points, First Place Junior; Ernest Marcouiller of Chicago, Illinois, 19 points, First Place Senior; John Sullivan of Washington, D. C., 14 points, Second Place Junior; Joseph Ehrhardt of St. Louis, Missouri, 12 points, Second Place Senior; Edward Reitze of Baltimore, Maryland, 10 points, Third Place Senior; and Henry Pacevitz of Chicago, Illinois, 11 points, Third Place Junior.

AERONAUTICS regards these tournaments as being of inestimable value in the training of the viewpoint of American youth towards a natural acceptance of the air. Much credit should be given Tom Rivers of the Playground Association for his capable promotion of the event.

"The Eaglet"
Only $1.00

20" wing spread. Very light and very strong.

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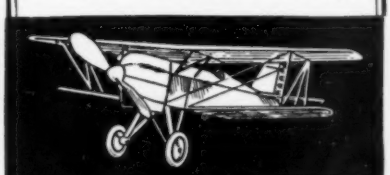

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of Lindbergh's Spirit of St. Louis. Scientifically designed and very realistic. Equipped with rubber band motor. Rises from ground by own power and flies 40 ft. or more. Easily built without tools. Construction set, with all parts and full directions, postpaid in U. S., only 50c (no stamps). Satisfaction or money back. Send now.
MANN & BENTON, Box M, Chillicothe, Ohio

PHYSICAL FITNESS AND FLYING

[*Continued from page 60*]

position and physical endurance.

"Dr. Ernest Koschel of Berlin believes that the study of psychology as applied to fliers is in its infancy," Dr. Davis reports. "He would still trust the personal judgment of the flight surgeon more than he would the recorded data. He considers that great consideration should be given to the sports in which the candidate likes to indulge and that by watching the candidate in these sports, his reactions, his movements, his method of handling himself, can be quite well judged by a flight surgeon."

In England the examiners have an excellent method but they do not stress the muscular balance of the eye as much as do American flight surgeons. They base their conclusions to a large degree on the Reid control tests. Dr. Martin Flack, a pioneer from World War days, is considered a leader in aviation medicine research. Under his direction there has been a trend toward simple examinations.

Concerning the psychological adaptability or inherent ability to fly Captain Flack observes that, "to become a good pilot the possession of good general judgment and coolness in emergency is necessary; test for nervous stability held to ascertain the potential presence of these qualities in any particular subject, but it will, however, not infrequently be found that bad judgment is not associated with any lack of nervous control in the accepted medical sense. Such cases of bad judgment, often combined with temperamental unfitness for flying, fall outside the scope of medical opinion."

Throughout the world efforts are being made to coordinate physical and psychological estimates, for upon a combination depends the selection of future pilots for military and commercial service. While flying becomes more simple in that transport and private pilots follow well-charted airways fore-armed with adequate weather reports, it continues to demand a combination of skill and judgment the sources of which the world's medical men seek to find.

THEY TELL US

[*Continued from page 41*]

weight of the turrets on so small a boat is almost sure to make the type bad rollers in anything like a heavy sea, and there is such a thing as being overgunned.

Later General Mitchell says, "submarines are the only sea craft to be feared, and they are really dangerous." I would point out that in future battle fleets will be accompanied by one or two aircraft carriers to ward off air attacks, so that battle fleets will still be dangerous. He seems to have forgotten that the submarine menace was very completely overcome in the last war, although not until late. As commerce raiders they found themselves foiled by the convoy system and the "Q Ships" but the real weapon against them was the hydrophone. By means of this instrument a submarine can be detected for miles, and its exact position *and depth* ascertained, so that it would have a very much better chance on the surface. A depth charge dropped over the spot works the rest.

In the article, "I could fly—Just give me a plane," the authoress states that women will make better pilots than men, in her opinion. As a matter of interest I should like to point out that last July at the Olympia International Air Show in London there was a pilot testing competition. This test was not a test of nerve so much as a test of balance, sensitiveness of touch, and mainly the speed of the brain in reacting to certain various conditions. It also shows up heavy footed people. The result was that something like seventy-five per cent of the men would have made fair pilots, but only *twenty-five per cent* of the women.

Whereas I am no authority, any facts I have stated here have been quoted from British equivalents of the AERONAUTICS. Should you find anything here that you are inclined to publish you are at liberty to do so, if not I expect you have a waste-paper basket handy.

L. A. PITTS

Oklahoma City, Okla., Sept. 26.—I noted with considerable interest your comments in the October issue of AERONAUTICS regarding government regulation of air transport lines, particularly because of the decided stand in favor of such regulation taken by this company at the recent First National Air Traffic Conference, sponsored by the Aeronautical Chamber of Commerce and held in Kansas City, September 16-18.

Upon reading carefully what you have to say and print, the first thought that strikes home is the surprisingly small number of air transport lines whose names are given as among those queried on the subject. There are more than fifty lines operating regularly now, but only four are listed among your correspondents. Would it not provide better material for thought to have the views of more transport operators? The Southwest Air Fast Express, I believe, is one of the largest of the independent operators, and is strategically located in probably aviation's most interesting and progressive trade territory, yet I do not see the name of this company nor any official of this company listed among your correspondents.

At the air traffic conference referred to above, Mr. A. F. Winn, special traffic representative for "SAFEWAY," read an address for Mr. Erle P. Halliburton, company president, who could not be present, advocating federal control and stating his reasons for believing it desirable. There were two outstanding points mentioned. They follow:

1. Federal regulation would prevent throat-cutting competition and create uniform fares.

2. Federal regulation, properly administered under the Interstate Commerce Commission, an off-shoot of that body or a separate Air Regulations Commission, would enable passenger and express operators without airmail contracts to add to their revenue and facilitate and expedite transportations of first class mail.

Mr. Halliburton stated that there are lines in this section of the country quoting varying prices for rides over the same line and in the same plane. A passenger might be given a price of 8.2 cents a mile with one city as destination, while another on board the same plane and from the same starting point, might be quoted a price of 13 cents a mile for another destination.

Regarding the second point, he asserted that effective regulation of airmail is vitally needed, to help the growing transport industry and to bring about reformation being sought by Postmaster General Brown. Responsible operators, under federal control, could speed up transportation of first class mail between scores of points now served moderately or indifferently well by railroads and effect quite a business saving in the course of a short while. An example is the situation on our own line between Wichita Falls, Texas, and Oklahoma City, Tulsa, and St. Louis and Eastern points. Train time between Wichita Falls and Oklahoma City is approximately eleven hours. Plane time is one hour. Time saved between Wichita Falls and St. Louis is approximately twenty hours and fifteen minutes.

It was apparently unanimous opinion of the traffic executives at Kansas City that Mr. Halliburton's proposal came a little too early in the game, but it is also true that more than one executive there was in accordance with his view but hesitated to express himself because of the strength of the opposition, and for other reasons.

I am sure that it was your wish to obtain an accurate expression from as many sources as possible on this important question, and I am also sure that Mr. Halliburton, if asked, would be glad to go more fully into details with you regarding his own opinions and details of his suggestion.

WM. VOIGT, JR.
—SOUTHWEST AIR FAST EXPRESS, INC.

Buffalo, N. Y., Oct. 14.—The round table discussion printed every month and presenting viewpoints of aviation from all angles is going to help build aviation into a much stronger industry than it is today.

I am planning a trip to the coast, I see many ads in the papers and magazines advertising safe, quick, and comfortable transportation. But I do not see anything about transportation by air. I know there are planes flying on regular runs, but maybe they are not the nice big ones you see pictures of. Maybe they are just cockpit planes. Maybe I would be sitting on a mail sack most of the way. So I plan my trip by rail.

The average man is interested in flying but is content to let somebody else do it. He is not kept informed of safety records being made, of quick, clean, and comfortable transportation in a huge air liner. Wonderful records are being made by the transport companies, let's keep the public informed of them.

ROBERT B. ROBINSON